MARINE REVIEW.

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Duty Truly Appreciated.

Transportation interests represented by the firm of Pickands, Mather & Co., Cleveland, are the largest on the lakes, involving the management of some fifty modern steel freight vessels. It is generally understood among vessel masters that in handling ships controlled by this firm, time is counted by minutes, especially when the vessels are in port. This policy is so strictly adhered to that it has often been the subject of unfavorable comment among vesselmen. It is therefore especially gratifying to note that this big concern, with all its rush methods, finds time to recognize, in a most fitting manner, a brave act performed by one of its captains and to set a high example to all of its employees. A few days ago the newspapers in all parts of the lakes commended the courage and skill of Capt. F. D. Root of the steamer Mariposa, in rescuing two sur-

CAPT. F. D. ROOT, OF THE STEAMER MARIPOSA.

vivors of the wrecked steamer Idaho, which foundered on Lake Erie. Capt. Root felt that he only did his duty and was undoubtedly more than satisfied with the public recognition of his action. But a pleasing surprise awaited him in the following kindly letter, which he received Monday upon completing another trip to Lake Superior:

Capt. F. D. Root, Steamer Mariposa.—Dear Capt. Root: I wish to express to you, and through you to all of your brave crew, my sincere appreciation of the unusually skillful seamanship, coolness, nerve and bravery displayed by you all in rescuing the two poor survivors of the Idaho, and to say further that notwithstanding the risk thereby involved to the safety of the steamer, your act has the hearty commendation of this company and of myself. Not alone in this instance was the excellent discipline existing on the Mariposa evidenced, but also to a marked degree at the time of the collision with the Selwyn Eddy, and in some recognition of it I wish you to give your first mate and your chief engineer an extra month's salary each, and to all the other members of your crew an extra half month's salary each, for which draft is inclosed herewith; and as for yourself, will you please call at our office upon your arrival down and receive in person from us a testimonial of our regard and esteem. Wishing you all continued good fortune in any other such attempts to save life or avert disaster if similar occasions again arise, I remain,

Very truly yours,
SAMUEL MATHER,
President.

Office of Minnesota Steamship Co.,
Cleveland, Nov. 15, 1897.

When, in answer to this letter, Capt. Root called at the office of Mr. Coulby, manager of the transportation department of the company, he was presented with a beautiful gold watch, inside the case of which the following was engraved: "Presented to Capt. F. D. Root by the Minnesota Steamship Co. for the bravery and seamanship displayed in rescuing the survivors of the steamer Idaho, Nov. 6, 1897."

Subscribers to the Review who have been receiving the paper through the marine postoffice, Detroit, will please notify us of home addresses at once, in order that changes may be made for the winter.

A Gunboat to Replace the Michigan.

Assistant Secretary Roosevelt of the navy department again manifests special interest in the naval reserve in his recommendations accompanying the report of Lieut. Gibbons, who has charge of naval militia matters. He recommends that congress be asked to substitute for the old Michigan on the lakes a small modern gunboat, perhaps of the Petrel type, to be devoted largely to cruising with the lake militia organizations and to overseeing them. Commenting on his personal inspection of the reserves, Mr. Roosevelt says:

"I was greatly pleased with the zeal and efficiency shown by the different organizations I personally visited (Ohio, Michigan, Illinois and New York), and no less with the showing made by most of the others, as set forth by reports to the department. There were two or three concerning which the reports were less favorable. The different state organizations are continually asking for old vessels, and the department has finally tried the experiment of sending the Yantic to the lakes for the use of the Michigan militia. The supply of these old wooden vessels has now become practically exhausted. The department has tried the experiment of loaning monitors to the different organizations, but the results have not so far been satisfactory, as monitors are poor ships for cruising or for use as barracks. There are three or four of these organizations, which, in the event of a sudden emergency, could be utilized at once for manning the smaller national cruisers, but this, of course, cannot generally be the case with the majority of the organizations. They must be depended upon primarily as a second line of defense. There are two very important features which should be attended to by such a second line. One is the placing of mines, the other the establishment of signal stations for coast defense.

"The department should request that there should be inserted in the provision for the maintenance of the naval militia the words, 'submarine mining outfits,' so as to allow of training them for this purpose. The department has also been maturing plans for the signal stations for the coast defense and a very slight expenditure of money with the co-operation of the treasury department, will put this on a satisfactory basis. The organizations are continually requesting the detail of officers to instruct them, and they can best of all be instructed by actual service on regular war vessels, or under the supervision of naval officers, and in conjunction with the sailors. It is much to be wished that congress will authorize in the first place the substitution for the old paddle wheel steamer Michigan on the lakes of a small modern gunboat, perhaps on the Petrel type, to be devoted largely to cruising with the lake militia organizations and to overseeing them, and, furthermore, to the building of one similar craft on the Pacific and two on the Atlantic, to be used for this same purpose. With these cruisers it would be possible to bring the naval militia organizations to a very high standard of efficiency, and the cruisers themselves, of course, would be available at any moment for any of the regular naval uses in an emergency."

The Two Richelieu and Ontario Steamers.

Mr. A. Angstrom, manager of the Bertram Engine Works Co., Ltd., of Toronto informs the Review that contracts for the two new side-wheel steamers for the Richelieu & Ontario Navigation Co. have finally been signed, and active preparations are being made for the construction of the vessels. The vessels will be of steel and of the following general dimensions: Length over all, 277 feet; length of keel, 269 feet; breadth of beam, moulded, 36 feet; breadth over guards, 62 feet; depth of hull, moulded, 14 feet. The interests of the Richelieu & Ontario company during the construction of the steamers will be looked after by Mr. Frank E. Kirby of Detroit. Work on one of the steamers, to come out late next summer, will begin immediately, but the second vessel will not be built until next winter.

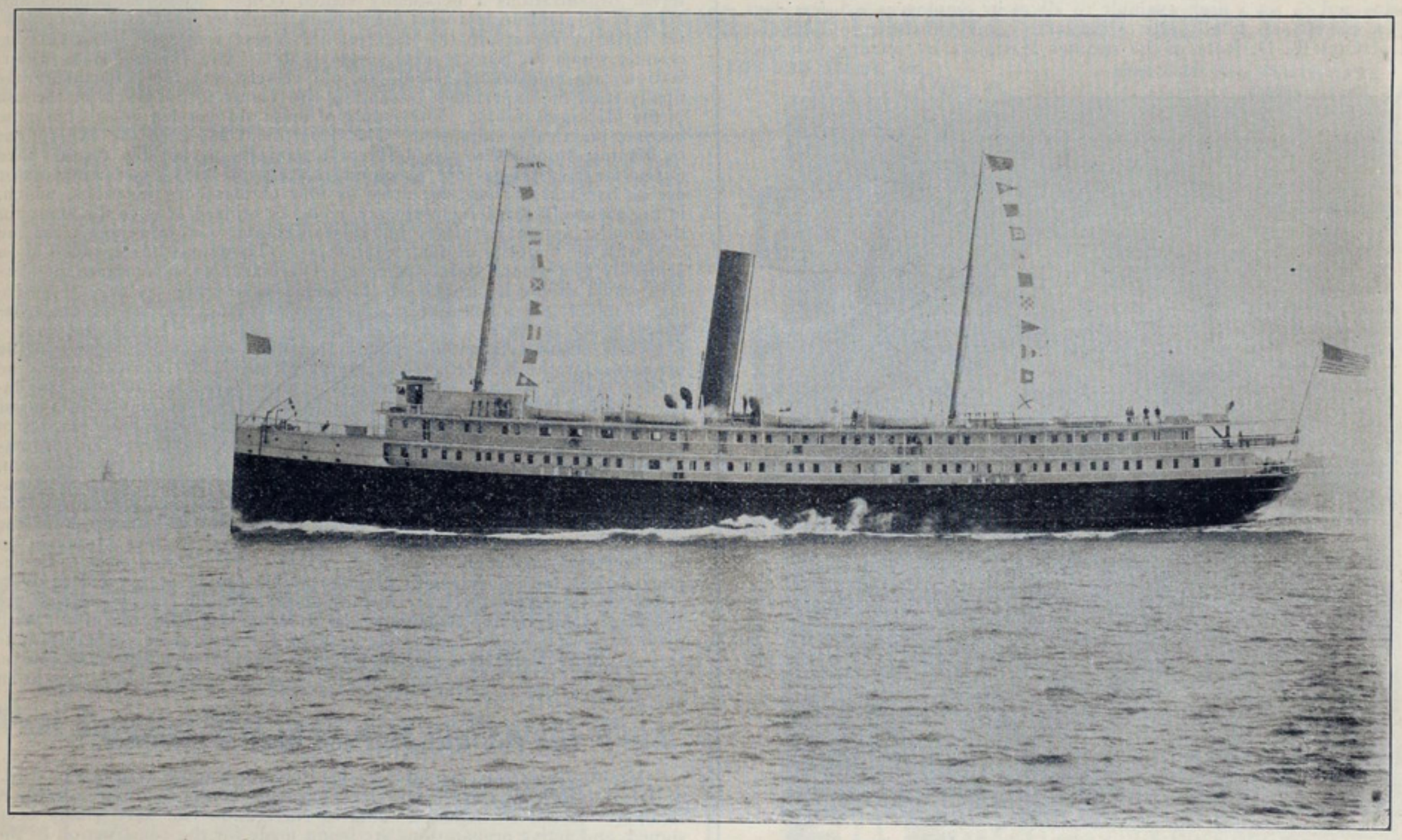
These vessels are to run between Toronto and Prescott, leaving Toronto in the evening and arriving at Prescott early in the forenoon of the following day. The run through the Thousand Islands will thus be in the morning, giving a splendid opportunity for observation of these waters, and with this end in view the dining room, capable of seating 112 passengers, will be forward on the upper deck. The steamers will each contain 140 staterooms, and will be designed to be allowed a full passenger list of 1,500. Engines will be inclined triple expansion, supplied with steam from four Scotch boilers. When all details of plans are complete they will be printed in the Review with a full description of the vessels, which will be in all respects equal to the best side-wheel steamers on the lakes.

Another meeting of a committee representing all of the American steamship lines, as well as leading commercial bodies and shipping organizations, will be held in Philadelphia on the 26th inst., to consider a plan to present to congress for means of improving the American merchant marine. The meeting would have been held earlier, but the members of the committee are awaiting the return of Mr. Clyde of the Clyde Steamship Co., who is now abroad, and who will give the committee the benefit of his observations while in Europe. This committee held several conferences during the last session of congress, but no definite plan was agreed upon, although several measures were thoroughly discussed.

The Yantic has left Montreal for Detroit, supported by six pontoons. She has had 12 feet of her bow, her keel and masts removed. If the ice does not hinder, her arrival at Detroit may be expected about Dec. 2. F. W. Wheeler & Co., who are in charge of the work of bringing the vessel through the canals from Montreal to Detroit, have sent the tug Boscobel to Montreal to meet her.

Passenger and Freight Steamer John Englis.

The steamer illustrated on this page is the John Englis, which has been operated during the past summer in freight and passenger service between New York and Portland, Me. She is owned by the Maine Steamship Co. and was built at the Roach ship yard, Chester, Pa. A description of this steamer is doubly interesting just now, as a second vessel, practically a duplicate and intended for the same route, is under construction at the Delaware river works. These ships are designed to make the run between New York and Portland in eighteen to twenty hours, averaging about 17 knots for both deep and shallow water. The John Englis is of steel, 313 feet over all, 290 feet between perpendiculars, 46 feet beam and 17½ feet depth of hold. Engines are triple expansion, with cylinders 30, 48 and 75 inches in diameter and a common stroke of 56 inches. There are six boilers of Scotch type, each 13 feet long and 13 feet 2 inches diameter, and each provided with three Purves ribbed steel furnaces, 40 inches in diameter. The working pressure is 180 pounds to the square inch. Pumps are of the Blake type. One hundred and thirty staterooms on main and spar decks provide accommodations for about 300 passengers, and the ship is capable of carrying also about 1,300 tons of freight. The cost of this vessel was about $350,000.



Steamer John Englis—In Freight and Passenger Service between New York and Portland, Me.

[PHOTOGRAPH BY N. L. STEBBINS, BOSTON.]

The Cramps of Philadelphia.

William Cramp, who founded in 1830 the great ship building establishment that bears his name, originally studied for the ministry, but was compelled by ill health to abandon his studies and seek outdoor employment. In the year 1857, his family having in the meantime grown up and several of his sons having had a thorough training in the business and exhibiting marked qualifications for it, William Cramp took into partnership two sons, Charles H. and William M. Cramp, and in 1862 his other sons, Samuel H., Jacob C. and Theodore Cramp, all of whom, with the exception of Theodore, are now and have been continuously members of the company. Theodore Cramp withdrew about twelve years ago. On the admission of the sons the firm took the name of William Cramp & Sons. Each performed some distinctive and important portion of the great and fast-growing business of the company, and together they formed one of the most vigorous, progressive and enlightened commercial companies to be found in the country.—Marine Journal, New York.

T. W. Butterworth, who has been connected with the auditing department of the Chicago & Northwestern Ry. Co., and who recently accepted the management of the new car ferry line between Milwaukee and Muskegon, is an enthusiast regarding car ferries. "The car ferry," he says, "is bound to play an important part in the transportation of freight between east and west. The saving in time, length of haul and cost of moving cars is an important matter. The Pere Marquette, for instance, makes a round trip across Lake Michigan in nine hours. I believe that the day is not far distant when every port on Lake Michigan will have a car ferry slip and cars will be transferred from any and all points on one side of the lake to all points on the other, without regard to connecting lines. The ferries will be run independently, just as are the freight and passenger boats of today."

Against Double Launches.

Some time ago there was launched simultaneously at the Union Iron Works, San Francisco, two small government vessels from two sets of ways, parallel to each other. The vessels collided and both sustained some damage. It is needless to say that although the launching of two vessels in this way was quite novel, it will not again be attempted at the Pacific coast yard. Mr. Geo. W. Dickie, general manager of the Union Iron Works, refers to this incident in writing of "Engineering Experience" in Cassier's Magazine.

"Two parallel lines are supposed to stretch out indefinitely," says Mr. Dickie, "but never to come together. Why did these two ships, launched on parallel lines, come together so suddenly, when their rudders were set to make them diverge? We have not yet been able to find a reason for it. Our experience is now against launching two ships at the same time from parallel ways; our experience forbids it being done in that way. Still, some one else might do such a thing and be successful, and thus acquire an experience totally different from ours, and never know how near he came to doing an unsafe thing. This illustrates what I mean by saying that no man can impart his experience to another, as it is acquired for his own use solely. If we were to be guided by another's experience, progress would be at an end in certain directions. Men have found that certain things could not be done, because they tried and failed; other men, searching for experience for themselves, will try to do these same things and do them successfully, and thus gather an experience that contradicts that of the others. And this process goes on continually. What my experience tells me will fail, another's experience tells him will succeed, and yet my own experience must guide me, and not that of another. Experience is a thing of slow growth, for often the first impressions produced by our work have to be modified as certain tendencies on the part of the work develop.

"This is especially true of moving mechanism. An engine or machine may make a fine start, and engineering experts may give good reports of it, so that its designer may feel justly proud of the result of his labors. But by and by certain tendencies begin to manifest themselves; workmen are employed nearly every night on it to keep it in condition to run in working hours; still the fatal tendencies keep developing until the machine is broken in constitution and must be abandoned. This is the end of many a fair start, and alas, how many of the model engines and machines that get conspicuous illustration and description in engineering publications come to just such an end! On the other hand, machines that required careful nursing at the start have developed constitutional strength that enabled them to serve their day and generation with credit.

"I have found it very instructive to go back ten or twenty years and study the designs for engines and machinery that figured in the engineering papers and magazines, and were advertised at the time as the results of the best experience of the firms making them, and trace them on through the succeeding years. Very many of those receiving the highest commendation drop out of existence altogether, experience having shown them to be constitutionally defective; while others, having sound constitutions as a foundation of development, appear again and again, modified to suit varied conditions, but still showing through all changes the good stock from which they sprang."

Pneumatic Steering Gear of U. S. Monitor Terror.*

The pneumatic steering gear is simple and powerful. Two athwartship cylinders, whose pistons are attached to the same heavy piston-rod, are firmly secured to castings built into the ship; the round stern of the Terror being peculiarly favorable to the athwartship arrangement. At mid-length, the piston-rod carries a slotted head, the brasses of which permit the sliding of the tiller as its angularity changes. The two cylinders are respectively to starboard and to port, and their outboard ends are utilized as motors. The common piston-rod is so large that only a small area is left on the inboard face of each piston. The inboard ends of the cylinders are connected by a pipe in which there is a controlling piston valve operated by the same mechanism that admits air to and exhausts it from the outboard ends of the cylinders. The distribution of air is effected by a simple slide valve receiving its motion from a "float lever," one end of which is controlled by an arm projecting from the rudder head. The float lever receives its initial motion from a threaded spindle working in a nut on the lever. The spindle can be revolved in various ways, to be mentioned hereafter. When the distributing slide valve is in mid-position, so also is the controlling valve, the latter preventing any exchange of air between the inboard ends of the cylinders. Any rotation of the threaded spindle moves both the distributing valve and the controlling valve, one valve supplying the power and the other relieving the elastic lock. The threaded spindle which operates the float lever lies in a fore-and-aft direction and carries various clutches, all but one of which engage with sprocket wheels. At the end of the spindle is a clutch which engages with an electric motor geared down by worm gearing. The wires from the motor lead to the rheostats at the steering stations in each turret and in the pilot house. The same stations are provided with small wheels which give motion to small wire ropes led to drums in the steering room. Each drum has its separate sprocket-chain connection to a screw spindle of the steering gear. So long as there is a supply of air, the principle of the float lever insures the motion of the tiller in obedience to that of the screw spindle. Each steering wheel is provided with a geared index, which acts as a tell-tale or indicator of the rudder's motion or, rather, of the motion which the rudder should have as a result of the motion imparted to the screw spindle of the float lever. It is proposed to connect the tell-tale directly to the rudder post. The officer of each gun has under his feet, just above the central column, a circular index with two concentric circles, one showing the amount of rotation of the turret, the other the helm angle.

The following table indicates the general dimensions and other data: Diameter of steering pistons, 14 inches; stroke, hard over to hard over, 5 feet 10 inches; lap of slide valve, nothing; exhaust lap, 1-32 inch; least tiller radius, 4 feet; least time, hard over to hard over, 120 pounds air pressure, at dock, 4 seconds; area of rudder, 81.2 square feet; width of rudder, unbalanced, 7 feet 9 inches; diameter of piping, 1½ inches; minimum air pressure that has been used if steering in smooth sea, 30 pounds per square inch; diameter of drum ropes, ⅜ inch; least pressure to move steering gear at dock, 5 pounds per square inch.

During the service of the Terror, since Feb. 13, 1897, the vessel has been steered only by the pneumatic machinery, either directly or by the electric control of the pneumatic valve of the steering engine. The pressure of 125 pounds per square inch in the steering cylinders is maintained by one of the main air-compressing engines running four revolutions per minute, the ship being under way at sea and air being drawn for steering only. The power of the steering cylinders is apparently excessive, owing to design for a speed of 12 knots, whereas the highest speed obtained with full power was but 9.5 knots.

A very quick helm is required in this ship, but, while the full helm angle is frequently used, it has not been found necessary to maintain, for steering, a pressure above 60 pounds, which gives an ample reserve of power. The economy of the plant is shown by the fact that an auxiliary compressing engine, installed for steering only, and weighing but 1,100 pounds, can maintain an air pressure of 125 pounds in the cylinders while the ship is manœuvering, and can furnish for steering at sea sufficient pressure at a much reduced number of revolutions. Changing to electric valve control is accomplished by simple means readily and quickly, leaving nothing to be desired in that respect.

Steering either in the chart house or in the forward turret has proved easy by the pneumatic wheel or by electric control. The transmission from the steering wheels in the chart house and turret to the pneumatic valve is not attended by great friction, the leads being good and comparatively short. The valve ropes from the steering engine to the steering wheel are run over and around ball-bearing sheaves, which reduce the friction to at least 50 per cent. less than the ordinary method. Air leaks about the steering cylinders are quickly discovered and easily repaired. In the service of this vessel but one considerable leak has occurred there and it was remedied by renewing the packing. This is the only repair which has been made to the steering engine during a year's service. The engine does not get out of order, and does its work with certainty and efficiency. Very little lubrication is required, and the engine and steering room are always free from dirt, heat, moisture, noise and shock. The board of officers who tested the apparatus expressed the opinion that "the pneumatic engine is well adapted to use for steering ships. It is certain, quick and accurate in operation, free from accidents and breaking down, and possesses the valuable quality of providing an elastic air lock for the tiller at every point to which it is moved."

To determine the minimum size of air compressor required to steer the Terror, observations were taken of the helm used in passing Governor's island into the East river. The position of the helm was noted every five seconds for fifteen minutes, and the results showed an average total helm of 68° per minute. This is equivalent to one full stroke of the pneumatic cylinder, whose capacity is 6 cubic feet. It has been found by repeated observations that when the ship is steaming at a speed of from 6 to 8 knots, and there is a pressure in the steering cylinders of 125 pounds per square inch, the helm can be moved by the air piston from amidships to hard over (34°) in four seconds, and from hard over one side to hard over the other side (68°) in seven seconds. When the ship was at the dock the helm was put from hard over to hard over (68°) in four seconds with 125 pounds pressure. The same speed of moving the helm through 68° with a pressure of 125 pounds per square inch down to fifty pounds, was maintained in the same length of time, four seconds. The rudder could have been moved faster but for the limit of the man's speed in turning the hand wheel for moving the valve in tiller-room.

There is considerable gain in the helm speed in the Terror, as the rudder can be started and stopped very quickly without danger, owing to the air cushion in the cylinder. The experiments showed that the helm followed the valve wheel instantly, without shock or noise. The electric motor for moving the valve and valve ropes used from 8 to 15 amperes of current at 80 volts. When the valve was moved slowly it required from 6 to 10 amperes. This gear was built and installed on the Terror by the Pneumatic Gun Carriage & Power Co. of Washington, D. C.

* Paper read at the fifth general meeting of the Society of Naval Architects and Marine Engineers, held in New York, Nov. 11 and 12, 1897.

History of Our Navy.

Messrs. Charles Scribner's Sons have given us what is on the whole the best history of the United States navy thus far published. Its author, John R. Spears, possesses special qualifications for his work. He spent three years at the naval academy, resigning July 31, 1866, and his academy experience was during the closing years of the civil war, when the whole country was alive with the stories of naval adventure. He is a thorough master of the nomenclature of the sea, and, as the author of "The Port of Missing Ships," "The Gold Diggings of Cape Horn," etc., he has learned the art of reaching the ears of people by effective writing. The great fault with so many works of historic research is that they are unreadable, and nothing less than a stern sense of professional obligation or zeal for historical instruction can persuade one to devote to them his hours of relaxation. There are no chapters in our national history so exciting and entertaining in themselves as those that record the story of the battles and adventures of our warriors afloat. The dullest of writers cannot make them altogether uninteresting, and to one who understands the art of picturesque and effective writing they furnish material for vivid description that equals imaginative writing in absorbing interest. Mr. Spears does not appear to have attempted much in the way of original research, but he takes the familiar facts of our naval history and presents them so effectively that they derive fresh interest from his skilful handling. His narrative is warm with the steady glow of an ardent patriotism, and no one who reads it can fail to have awakened in his heart a more earnest love of country and a surer resolution to sacrifice all, if need be, in defense of his native land and for the honor of the flag. Hence these are admirable volumes to place within reach of our novitiate heroes. That they will soon be in the library of every man-of-war in our service we do not doubt, and no public or private library that takes note of heroic literature can be complete without them, for their study will inspire young and old alike with the spirit of self-sacrificing patriotism. We may thank God and take courage for the future of our country when we find Mr. Spears declaring, as he does, with undoubted truth, in speaking of our early naval heroes, "that every class graduated from the naval academy at Annapolis contains men of equal bravery and resources—men needing only the opportunity to show their mettle." Mr. Spear's history is handsomely printed and interesting illustrations swarm through the volumes, numbering hundreds in all. A number of full-page illustrations of engagements during the civil war are copied from paintings by Admi. Henry Walke, U. S. N., one of the most gallant heroes of that war.—Army and Navy Journal.

Northwest Wheat Crop.

Advices from the northwest spring wheat states are that the wheat crop there has been marketed more rapidly than usual, it being estimated that 53 per cent. of the yield had been stored in second hands by Nov. 15, as compared with about 43 per cent. one year ago and in like portions of preceding seasons. It is estimated that about 100,000,000 bushels of wheat are to be shipped to Minneapolis and Duluth from this crop, of which, therefore, about 53,000,000 bushels have been received. Should this estimate prove true, there are still 47,000,000 bushels of spring wheat to go forward, of which 7,000,000 bushels are already out of farmers' hands, scattered along various lines of northwestern railways, leaving 40,000,000 bushels, nominally, in farmers' hands, a large portion of which, of course, sooner or later, will have to be marketed. There are several careful observers in the northwest who think that these figures are too small, but as the people living in the region referred to are constitutional bulls on wheat, any tendency to magnify the size of the crop there must be regarded as conservative.—Bradstreets.

Following close upon the building of an experimental tank for trials of ships' models at the Washington navy yard, comes the announcement from Ithaca, N. Y., that there is in process of construction at Cornell University a general hydraulic laboratory, to be under the charge of the College of Civil Engineering. One feature of this laboratory will be an experimental tank or canal about 350 feet long by 16 feet wide and 10 feet deep. While this tank is a part of a general hydraulic laboratory installed in charge of the College of Civil Engineering, it is expected that, through the kindness of the director of the college, it will be available for distinctively marine work as well. It has long been the desire of Prof. W. F. Durand of the College of Naval Architecture and Marine Engineering at Cornell to bring about in this country the construction of an experimental tank that would not be confined to naval uses or controlled by private enterprise. His idea was to take full advantage with such a tank of the great opportunities for general advancement of the science of ship building. It would seem that Prof. Durand's wishes are about to be gratified to a large extent in the construction of these two basins, with their accompanying scientific apparatus. The results of investigations to be made at Washington and Ithaca will not be buried in secrecy.

The Brown Hoisting & Conveying Machine Co. of Cleveland has contracts in hand for half a dozen plants of their special kind to be applied to iron furnaces, steel works and docks in Germany, Russia, Japan and Central America. They are erecting for Fried. Krupp & Sons blast furnace machinery similar to that applied to the big blast furnaces of the Carnegie company.

Thirty Feet Added to a Big Steel Steamer.

A remarkably quick job of lengthening a Hudson river steamer is reported from New York. The steel side-wheel passenger steamer New York of the Albany Day Line has just been floated from the Erie Basin dock of the J. N. Robins Co., after having been cut in two and lengthened by the building of a midship section 30 feet long. Only twelve days, or 108 working hours, were consumed in completing this work as far as the steel shell and main deck are concerned. After the boat was on the blocks in the dry dock the butts on the plating of the hull and the three decks were removed and then the forward half of the steamer, containing the boilers and weighing 350 tons, was hauled 30 feet away from the after half in the remarkably short space of 5 minutes 30 seconds. The next forenoon, in less than five hours' working time, all the fifteen frames for the new section of the boat were in place. The plating, bulkhead, strengthening, keelsons, etc., were then put in place, and the vessel removed from the dock in the short space of time noted above. The vessel will now be 331 feet long by 75 feet wide over the guards, and 11 feet hold. A writer in the New York Sun gives an interesting account of the appearance of the vessel in dock after she had been cut in two. He says:

"The New York, which has been plying on the Hudson river for ten years, presents a strange appearance in the Erie Basin dock. She exhibits her interior in the interesting way in which such sights are usually to be seen only in sectional drawings. Viewing the vessel from the bottom of the dry dock where she lies and standing between her two sections, she looks not unlike a three-story house rent in twain. Looking into what might be the cellar of the house one discovers on the one side the face of three big steam boilers with the doors of their six furnaces, while on the other side is the heavy steel framework of the steamer's engines. A floor above, on the main deck of the steamer, are the rooms of the engines and boiler tops, flanked by gangways, and a floor higher up the main saloon and its margin of private parlors appear on both parts of the vessel like the smaller divisions of the upper part of a house. The similarity ends there, for it is not usual to find above the roofs of houses, as here, three big smokestacks looming up side by side on the one hand, or a big black walking beam sticking up over a roof on the other hand. The boat, from the guards line upward, has been cut in two as fairly and evenly as if the work had been done with a big whipsaw. Below the guards, where the joiner work ends and the steel hull lies, her lines are uneven and jagged, as if she had been rent apart by a mighty pull. She was pulled apart, but this was not done until after every rivet that held the steel work had been cut and removed, and carpenters, with hammers, saws and chisels had separated all the woodwork. When she was ready for the pull, a pair of jackscrews gave a start to her bow section, a couple of steam winches kept it sliding and in five and a half minutes by the clock the two ends of the great steamer were exactly 30 feet apart, with the boilers and pilot house on one side of the gap and the engines and paddle wheels on the other.

"Before the New York was floated into the dry dock much had been done toward the latter work. Besides preparing carefully levelled keel blocks upon which she would settle as the water left her, there were already in place long lines of massive timbers, one on each side of the keel blocks, known as standing ways. Guide planks were bolted to each side of these timbers, and the tops of the ways where they were to come under the bow sections of the boat were liberally covered with grease. As soon as the vessel had settled upon the keel blocks and while workmen were cutting her in two, other workmen swarmed about her outside, preparing for the important work of moving one end as soon as it should be free. The stern they made stable with bilge blocks and braces. On the greased ways under the bow part they put other great timbers called sliding ways, and upon these cross pieces, from which blocking was built up until, with wedges driven home with great sledge hammers. the weight of the ship was transferred from the keel blocks to the sliding ways. Meantime inside the ship holes were cut from the saloon deck to the hold in each midship section of the vessel, and plumb bobs were hung in these with tally marks and straight edges along their suspending cords to show any movement out of plumb or level. Two other lines were carried almost from stem to stern of the vessel, one down each gangway, and, where these crossed the line of cutting, marks were set up on either section. These lines were to determine at any time whether the two sections of the vessel as she was pulled apart were still exactly in line fore and aft. The preparations for the moving had all been so carefully made that after the 30 feet had been gained the test lines showed that the two parts were exactly in line, level and plumb, and ready to begin to build them together again. To join the hull part it was necessary to put in sections of keel and keelson, stringers and plates each 30 feet long, and fifteen new steel frames, duplicates of the two between which the cut was made. Nearly all of these parts were ready made before the steamboat was even brought to the dock, and the others were all cut and waiting to be punched with rivet holes as soon as templates could be got from the lines of holes in the severed hull. Even before the steel work was finished the carpenters had begun on the upper works. Although the center part of the hull was left straight, the line of the guards was swelled out gracefully, and the New York will probably be even a handsomer boat than she was before, and perhaps faster."

The United States hydrographic office announces the publication of a chart of the world, No. 1682, showing area in the Pacific ocean having Hawaii as the only base of supplies in transpacific voyages, and showing, for purposes of comparison, an area of equal extent covering parts of America, Europe, Africa, Atlantic ocean and Indian ocean. A table is printed on the chart showing the steaming distances in nautical miles from San Francisco to the principal ports and islands of the Pacific ocean. The distances are also given from Honolulu to the important ports of Asia and America, and to the principal harbor in each of the island groups; also the power to which the principal island groups of the Pacific ocean belong. The chart may be had from the Marine Review.

A lithographed wall map of Alaska showing the overland trails and all water routes to the Klondike gold fields will be mailed upon receipt of five 2-cent stamps. Address advertising department, the Nickel Plate road, Cleveland, O.

No. 391, Dec. 31.

Our New Torpedo Boats.

The torpedo boat, considering its advantages as a vessel of war, is a very cheap craft. Taking as a basis of estimate recent bids submitted to the navy department, some twenty-five 30-knot torpedo boats, or twenty or more torpedo boat destroyers, can be built, including their armor and armament, for the cost of a single battleship complete. With the thirteen torpedo boats ordered of late by the United States government—ten in October, 1896, and three in August last—every precaution has been taken to secure the latest improvements, the contractors not being confined in any instance to the navy department plans, but being allowed to bid also on plans of their own. In fact, the proposals of the department were general in their nature, so as to induce ship builders to include in their own plans every modern improvement that competition could suggest. In this way the government has been able to avail itself not only of the knowledge of its own constructors, but also of that of the ship builders. This it has not hesitated to do, as is shown by the awards, for in all but the case of one of these boats contracts were awarded on contractors' plans. For the ten of the thirteen boats contracted for in October, 1896, the awards were for three different classes of boats, four being for 20-knot, three 23 1-3-knot and three for 30-knot boats. This classification resulted from adjusting the available appropriation to the greatest number of suitable boats procurable, careful consideration, of course, being given to what was needed in view of the almost total lack of torpedo boats of any description and the character of work that would most likely be required of them.

It was very clear from the plans submitted that the ship builders had examined carefully the latest boats abroad. The Union Iron Works was awarded the contract for a vessel of the torpedo boat destroyer type. This vessel, which has been named the Farragut, when completed, will be similar to the Desperate, the latest torpedo boat destroyer built by England, and it is safe to say that the departures by the Union Iron Works from the plans of the Desperate are in favor of a more formidable and effective boat. The Bath Iron Works, the successful bidders for the other two 30-knot boats, consulted in the preparation of their plans Professor Byles, of the University of Glasgow, the designer of the Atlantic liners steamers Paris and New York. This company was so confident of what it could accomplish that it exceeded the requirements of the law and guaranteed a speed of 30½ knots. The three boats for which contracts were awarded in August last are all required to make 30 knots. There is every reason to believe that all these torpedo boats will fulfill expectations.

The Spirit that Built the Erie Canal.

Mr. Carl Snyder, who wrote in the November issue of the American Monthly Review of Reviews about the canal way from the lakes to the Atlantic seaboard, is a journalist of New York city, who has been a frequent contributor to that magazine. Mr. Snyder is not an engineer, but has a considerable acquaintance of the journalistic kind with engineering matters, and has frequently written on subjects of that sort. He is said to be one of the best of the young professional magazine and newspaper writers in the country. It is unfortunate that in dealing with this subject he gave so much prominence to the Chauncy Dutton pneumatic lock scheme, for which leading hydraulic engineers of the country have little regard. This part of the article looked like advertising, but Mr. Snyder brought out a few new and valuable points otherwise. "New York and its environs today," he said, "contain a population of between 3,500,000 and 4,000,000. When the Erie canal was opened it had cost a little more than $7,000,000. It will indicate something of the enterprising spirit of that day to say that were the ship-canal from the great lakes to the sea now under consideration to cost $300,000,000 (perhaps $400,000,000), it would be less a burden to the single state of New York than was the Erie canal when it was built. If, further, we consider the enormous territory which such a ship-canal would directly benefit—not less than sixteen of our greatest states and the whole of Canada—the expenditure of $1,000,000,000 would represent relatively less of an outlay than that undertaken by the resolute and hard-headed people of New York state three generations ago."

Repair Work at West Superior.

West Superior, Wis., Nov. 23.—On Saturday last the American Steel Barge Co. had men engaged in making repairs of one kind and another to six vessels in the vicinity of this port. The list included the Empire City at Duluth, Sagamore and Manda at Alouez bay and the barges 104, 110 and 202 at West Superior. The steel tug that is used in connection with the ship yard is a very handy vessel, and is the means of saving valuable time to the big freight carriers that may be in need of minor repairs. When the ship yard gets word of a repair job, the tug is often sent out to meet the vessel, and if men can be put to work, they are on the tug ready to begin at once. Of the repairs referred to above, the most important job was probably on the Manda, which was injured by the Sagamore running into her. A hole was punched in her stem and two frames broken. She was only temporarily repaired. The Sagamore displaced her bow chock and broke a frame, which were made good before she left. The barges 202 and 204 required rudder repairs; the Empire City's electric wiring was renewed in part, and the 110 had a number of rivets made tight and some repairs also to fender bar. The barge Constitution, which will probably be laid up here during the winter, will require extensive repairs to her starboard bottom and to both sides of her bow. This was determined by a survey held a few days ago. The bottom damage occurred at the Lime-Kiln crossing and the bow damage in the Sault river. Several plates and frames must be fixed or renewed in both jobs. The vessel was permitted to make another trip.

The Vulcan Ship Building Co. of Stettin, Germany, has undertaken the task of transforming the single-screw steamship Spree of the North German Lloyd fleet into a twin screw vessel. The steamer is to be lengthened at the same time by 70 feet and will receive two engines, each on four cranks, instead of her present single screw engine. Her power will be increased by several thousand horse power, and in order to carry out these radical changes the Vulcan company is having a floating dock constructed in England of about 15,000 tons capacity, which will place the works in a position to undertake the most extensive operations of this kind.

Mr. Wisner's Criticism of the Symons Report.

The strongest argument that has ever been prepared against the proposition to construct a ship-canal from the lakes to Atlantic tidewater is the report of Major T. W. Symons, of Buffalo, recently submitted to congress by the secretary of war. Geo. Y. Wisner, of Detroit, one of the commission of engineers recently appointed by President McKinley to consider this question, is a canal advocate, and a short criticism which he makes of Major Symons' report will therefore prove interesting. Major Symons declares that a deep waterway—that is, one capable of admitting an ocean vessel to the lakes, or of letting the large type of lake steamer and barge of the lakes through to tidewater—is impracticable from a commercial point of view, and unnecessary. He estimates that the cost of building such a waterway to accommodate vessels 500 feet long, 50 feet broad and drawing 20 feet, would be $200,000,000 to build and $2,000,000 a year to maintain, and figures that it would be necessary to effect a saving of 33 1-3 cents per ton on freight, or one cent a bushel on wheat, to pay the interest charge on the cost. He urges that instead of building a deep waterway, the United States better deepen and widen the Erie canal to accomodate barges 200 feet long, 30 feet broad, and 10 feet draft, carrying 1,500 tons to a load. Mr. Wisner says.

"Maj. Symons has presented a powerful argument in support of his theories. His idea is the popular one in New York, while the deeper channel, permitting the lake fleet to reach tidewater has been more popular at the head of the lakes. We are required to make estimates on a 30-foot excavation, and shall incidentally show the cost of shallower channels. Major Symons has done well with the means at his command. He didn't have the funds to make the complete investigation we are undertaking. He was forced to content himself with the information already at hand, information that the former deep waterways commission, of which President Angell was chairman, had presented. He reached a different conclusion from the former commission from the same data, not a rare thing among engineers. There is one criticism I would offer on his plan. The day of small vessels in competition with railroad lines is past. Many of the boat lines are now mere links in a railroad system. If the barge lines on Maj. Symons' magnified Erie canal, like the competing railroad lines, are to own steamers on the lakes for feeders, then they may get freight; but otherwise the 1,500-ton barges will be just where the canal boats are today, picking up the leavings. By opening up a route to permit cargoes loaded at Chicago and Duluth to pass speedily and without transhipment to tidewater, it will become necessary for the railroads to use the waterway with their own steamers, or be hit hard by the competition of the independent vessel owners. Then the cheaper commercial highway will become beneficial. I don't mean to say that the 28-foot channel is advisable, or what depth of water would give the best results; or even that a deep waterway is commercially practicable. I believe our investigations will eventually throw a great deal of additional light on the subject, and probably furnish convincing proofs as to the best policy for the government to pursue.

Buffalo Branch Hydrographic Office.

Ensign C. T. Jewell, U. S. N., who is in charge of the new branch hydrographic office at 1344 Guaranty building, Buffalo, makes formal announcement of the opening of the office. The supply of charts and reference books is not as yet complete, but the office was opened on Monday last and will be open daily in future from 9 a. m. to 4 p. m., and all interested in the navigation of the lakes or oceans are invited to call. Mr. Jewell hopes that masters and others will visit the office frequently during the winter, so that when the next season opens they will be acquainted with both the workings of the office and with its personnel. This office will be modelled on the plan of those already established at Cleveland and Chicago, which have been so much appreciated by lake vesselmen. The navy department hopes by the establishment of this new office, together with others to be opened next spring at Duluth and Sault Ste. Marie, to bring to all vessel owners, agents and masters on the lakes a complete knowledge of the various bulletins of important information which it is constantly supplying to those interested. When the Buffalo office is fully equipped there will be on hand a complete library of nautical charts and sailing directions of the world for inspection by the public. Information affecting nautical charts is regularly secured from all sources. Nautical inquiries will be promptly investigated and answered. Barometers and other instruments will be compared with standard instruments upon application. All services are free. As soon as the equipment can be obtained a time ball will be dropped from a staff on the roof of the Guaranty building daily (Sunday excepted) at noon, eastern standard time. The ball will be dropped by electricity from the standard clock in the naval observatory at Washington. Mr. Jewell wishes to direct attention to advantages to be gained if masters and mates will make themselves familiar with the workings of the hydrographic office, the object of which is entirely in the interest of safe navigation. He is confident that if interested persons will take the time to visit the Buffalo office they will be convinced of the value of the work which the hydrographic bureau has in hand.

Another contract for Howden hot draft equipment is announced by the Dry Dock Engine Works of Detroit, and it would seem from the large number of orders now in hand that this concern will be crowded during the winter on this kind of special work, to say nothing of the engines and boilers required for the new ships being built by the Detroit Dry Dock Co. The latest Howden contract is with Pickands, Mather & Co. of Cleveland, agents for the American Steel Barge Co., and the vessel is the whaleback steamer Thomas Wilson. The artificial draft is to be applied to the present boilers in the Wilson, with a view to securing better combustion and more steam with attendant economy, the Dry Dock Engine Works giving assurance of a money saving of 15 per cent. by the operation.

Luce's "Seamanship" has been a text-book at the United States naval academy for the past thirty years. It is being used by naval reserve organizations all over the country. It is a standard work, selling at $10, and will be mailed to any address at that figure by the Marine Review, 409 Perry-Payne building, Cleveland.

Addressed to the Inspector-General.

Editor Marine Review:—Referring to an article in your issue of the 18th inst., signed by James A. Dumont and probably intended as a reply to several of your correspondents who availed themselves of your valuable columns to criticise the acts of the board of supervising inspectors of steam vessels, by stating facts which so far they have failed even to answer, much less refute, I beg to make the following statement:

It was not my intention to enter into any personal controversy with Mr. Dumont, but when he styles me with the rest as a "land navigator," and calls up false testimony, or garbles the statement of another to sustain him in this assertion, I desire to say that it is decidedly becoming to him, who I doubt has ever been seen 10 feet above deck unless he was hoisted there in a boatswain's chair and lashed therein for fear that he might fall out, to use such a despicable term as his only means of reply against the just criticisms which have been made of the board over which he holds almost omnipotent sway. Like the fellow kicked by the mule, I will consider the source whence it came and dismiss it without further remark.

It is quite evident that the writer of the article headed "That Double-Track Idea," knows well what he is writing about and is a man of experience and a sailor, a compliment I cannot pay Mr. Dumont, but when he concludes with the prayer of the lake vessel masters that "the land navigators, of whom there are some two or three most active, render us the great service to keep from trying to reform a business of which they have proven themselves quite ignorant," it seems to me that he could have intended to refer to no greater "land navigator" than the distinguished ??? head of the steamboat inspection service himself. Yet with his usual adroitness Mr. Dumont uses it as a subterfuge and a weapon with which to smirch those who in the interest of the public have openly advocated that the reform referred to by the above writer should commence, not on the lakes, but with Mr. Dumont himself, the great law-giver and head center, who is continually meddling with the business, more than anyone else.

As to the resolution spread on the minutes of the board from the Grand Lodge of Ship Masters, I cannot see any reason for such extraordinary action on the part of this board, unless it was sought for by Mr. Dumont to bolster up himself and his assistants in their positions, thus following the usual tactics they have always pursued when their acts were criticised. Anyone who knows Mr. Dumont knows that he is perfectly capable of doing this, and that whenever he asks any encomium from ship owners or ship masters it is never refused, simply because it is to their interest to keep on friendly terms with him. He will give to the ship owner, ship master or anybody else anything that they may ask for if he is of the opinion that their influence may be used to his advantage. It is unnecessary to remind readers of the Review that these resolutions do not represent the feeling that prevails on the lakes, as expressed by numerous communications in your columns during three or four years past.

I understand that the inspectors of hulls are all to be overhauled and subjected to civil service examination. Now, I would like to know, in the name of justice and civil service reform, is it the intention to have Mr. Dumont sit on the board as one of the examiners? If, as Mr. Spencer said in your issue of the 11th inst., "it is criminal negligence to permit men who have absolutely no knowledge of ship construction to pass judgment upon the safety of hulls and boilers, and this is a matter of daily occurrence," how much greater and more enormous the crime would be to place a man totally incompetent on a board to pass judgment on the qualifications of his own appointees seeking certificates from it as inspectors of hulls and boilers.

Apropos of the laudatory encomiums of the Grand Lodge of the Ship Masters' Association, which Mr. Dumont makes so much of, I desire to say that it only goes to prove what I said in my letter of Oct. 18 last, which reads as follows (last paragraph): "In conclusion I could refer to many cases that would tend to show that the suggestion of Veritas to reorganize the entire board by means of a competitive examination cannot be carried out too soon, and I am satisfied that in the interests of ship owners and the public an immediate change is demanded from the incompetent and oppressive rulings of this mutual admiration society, which only meets once a year to exchange mutual congratulations upon their success in holding their positions, have their pictures taken, attend several banquets, and then adjourn." By consulting the printed minutes of the board anyone can see for himself that with every matter presented before it, the result is yeas eleven, nays none. Have you ever seen or heard of such total unanimity among men from all parts of this great country? Is it on account of the one-man rule and the lack of independence of the supervising inspectors, some of whom at least know more in a day than Mr. Dumont knew in his whole lifetime, or what is it? Let Mr. Dumont answer this if he can.

OBSERVER.

New York, Nov. 22, 1897.

In his annual report, to be made public about the 27th inst., Secretary Long will recommend the construction of four new dry docks, one each at Boston, Portsmouth (N. H.), Algiers (La.), and Mare Island, and the widening of the docks at New York, League island and Norfolk. Although the secretary has been opposed to recommending new ships until additional dry dock facilities are provided for, he will probably recommend the construction of two new battleships and six torpedo boats. This is the opinion of the Army and Navy Journal, whose Washington correspondent is usually quite correct in naval matters. A proposition will probably be submitted to the navy department shortly by a Brooklyn firm, contemplating the subsidizing of a steel floating dry dock, which it is proposed to erect near Brooklyn, N. Y. A member of the firm has been negotiating with a representative of Clark & Stanworth, dock builders of England, in regard to the construction of such a dock. According to reports regarding the dock, it is proposed to make it large enough to accommodate the heaviest battleship of the navy and also to take in ocean liners. It would not be possible for the navy department to grant a subsidy for a dock without express permission from congress, but there is reason to believe that a proposition of this character would be considered by the department, with a view to submitting a recommendation on the subject to congress.

All charts sold by the Marine Review are corrected to date of sale.

MARINE REVIEW

DEVOTED TO LAKE MARINE AND KINDRED INTERESTS.

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The books of the United States treasury department on June 30, 1896, contained the names of 3,333 vessels, of 1,324,067.58 gross tons register in the lake trade. The number of steam vessels of 1,000 gross tons, and over that amount, on the lakes on June 30, 1896, was 383 and their aggregate gross tonnage 711,034.28; the number of vessels of this class owned in all other parts of the country on the same date was 315 and their tonnage 685,204.55, so that more than half of the best steamships in all the United States are owned on the lakes. The classification of the entire lake fleet on June 30, 1896, was as follows:

	Number.	Gross Tonnage.
Steam vessels	1,792	924,630.51
Sailing vessels and barges	1,125	354,327.60
Canal boats	416	45,109.47
Total	3,333	1,324,067.58

The gross registered tonnage of the vessels built on the lakes during the past six years, according to the reports of the United States commissioner of navigation, is as follows:

Year ending June 30. 1891	204	111,856 45
" " " 1892	169	45,968.98
" " " 1893	175	99,271.24
" " " 1894	106	41,984.61
" " " 1895	93	36,352.70
" " " 1896	117	108,782.38
Total	861	444,216.36

ST. MARY'S FALLS AND SUEZ CANAL TRAFFIC. (*From Official Reports of Canal Officers.*)

	St.Mary's Falls Canals.			Suez Canal.		
	1896*	1895*	1894	1896	1895	1894
Number of vessel passages	18,615	17,956	14,491	3,409	3,434	3,352
Tonnage, net registered	17,249,418	16,806,781	13,110,366	8,560,284	8,448,383	8,039,175
Days of navigation	232	231	234	365	365	365

*1895 and 1896 figures include traffic of Canadian canal at Sault Ste. Marie.

In his annual report, Secretary Alger of the war department transmits without reduction the estimates for river and harbor improvements submitted by the chief of engineers. They amount to $48,728,160, or more than double the appropriations for the present fiscal year, which ends June 30, 1898. The secretary says these estimates are largely in excess of what they should be at a time when the demands upon the treasury are as great as now, therefore he recommends a large reduction. But in justice to the chief of engineers Secretary Alger adds that these estimates were made by his own direction, that the facts might be placed before congress, showing what the expenditures would be if all the requirements were complied with, and he cites the fact that the outstanding continuous contracts for river and harbor work will require an expenditure of over $17,000,000 for the next fiscal year; of over $14,000,000 during the fiscal year ending June 30, 1900; $5,700,000 during the fiscal year ending June 30, 1901; $796,000 during the fiscal year ending June 30, 1902, and $345,000 during the fiscal year ending June 30, 1903. "The time seems to have arrived," says Gen. Alger, "when an increase in the number of officers and enlisted men of the engineer corps is indispensable. The immense work intrusted to a few men is overtaxing, and it is believed a great saving of money in securing efficient and thorough work by contractors in fulfillment of their contracts would be effected by detailing a young officer to remain on each work under construction or improvement to see that day by day all material as purchased, both in quality and quantity, and according to specifications, is furnished. It is absolutely impossible for one man, having a large number of works a long distance apart, to constantly supervise the construction of improvements in his charge. This is one special reason why it is believed that an increase of cadets at West Point will be beneficial, as more than formerly can be assigned to the engineer corps and profitably employed."

With the opening of another season of navigation, two or three eophones will have been fitted to the pilot houses of lake steamers. This is the instrument which is said to accurately locate the place from whence sound comes and show its bearing from the ship on a dumb compass. The use of this instrument on lake vessels would be especially valuable, on account of frequent fogs and the fact that vessels are most of the time in narrow channels or in close proximity to the shore. Lake vessel masters are slow in taking up new devices, but it would seem that this one will be quite extensively adopted as soon as it is given a trial that will bring it directly to their attention. There is nothing complicated about it and it needs little more training to operate than would be required in the use of a telephone. Two boards of naval officers have tested it on the U. S. S. Indiana and have recommended its use generally. It was also tested and investigated by the United States light-house board, and as a result, twelve of the instruments have now been ordered for that service, and are at present being installed on the ships under the control of the board. The United States revenue marine service investigated the instrument, and congress at its last session, on the recommendation of this bureau endorsed by the secretary of the treasury, made an appropriation for ten of the instruments to be put on government vessels of that service. A pamphlet fully descriptive of the eophone will be received upon application to the Eophone Co., Bowling Green building, New York.

The Army and Navy Journal says that the navy personnel question, brought about by the demand of the engineer corps for positive rank and the right to command enlisted men, will be made the subject of a special report to congress by Secretary Long. In his annual report, to be made on Saturday next, the secretary will simply refer to the fact that a board appointed to consider the question of reorganization is now in session, but he will undoubtedly adopt the findings of the board and submit them to congress for action. The manner in which the navy will be affected by the plan of reorganization is officially stated as follows: "There will be no change in the duties of the older engineers who are not graduates of the naval academy. They will continue to perform engineering duties only. Those engineer graduates, who entered as engineers, will be allowed to determine for themselves whether they shall qualify to perform the duties of line officers or continue their present duties. It is proposed to transfer all of the young engineers who entered the navy as naval cadets, provided they shall fit themselves after a reasonable time to perform the duties of line officers as well as engineer officers. The younger officers of the line of corresponding date will, if the board's views be adopted by congress, have to undergo practical training in engineering so as to fit them for that duty in addition to that which they now perform."

Referring in his annual report to the model tank under construction at the Washington navy yard, Chief Naval Constructor Hichborn says: "The acquisition of an experimental tank is a source of immense gratification to the bureau, which has advocated its construction for nearly ten years. It will undoubtedly prove of the greatest value to the bureau in connection with its work, as well as to the general ship building interests in this country, and it can be confidently stated, moreover, that the tank when completed will be the largest and best equipped in the world." The remark that the tank will be of value "to the general ship building interests of the country" would seem to indicate that there will be no secrecy about the numerous trials of models that will be made when this basin with its scientific apparatus is complete. Construction of the basin, which is to cost $50,000, is well under way. The Penn Bridge Co. of Beaver Falls, Pa., are the contractors. Designs and plans for the towing apparatus, recording mechanism, etc., are now being prepared with a view to their installation as soon as possible after the completion and acceptance of the tank.

The lakes are again leading other shipping districts in the adoption of water tube boilers for high-powered harbor tugs. With a great increase in the size of lake freight carriers, the small harbor tugs in leading ports must be replaced, within a few years, by steel vessels that will have engines of 600 to 1,000 horse power. Economy in weight, space and other important particulars will be secured in these vessels by the use of water tube boilers. The latest announcement of a tug contract comes from Buffalo. The Union Dry Dock Co. of that city will build for the Maytham Tug Line a steel tug 90 feet long, 23 feet beam and 12 feet hold. Triple expansion engines, with cylinders 16, 25 and 40 inches diameter and 27 inches stroke, will be furnished by H. G. Trout & Co. There will be two water tube boilers having 100 feet heating surface and allowed 250 pounds steam pressure.

Thirty-two pages of the annual report of Chief Naval Constructor Hichborn are devoted to tables giving dimensions and other particulars of all vessels belonging to the United States navy, built and building or authorized. There are 141 of them, divided as follows: First-class battleships, nine; second-class battleships, two; armored cruisers, two; armored rams, one; double-turreted monitors, six; single-turreted monitors, thirteen; protected cruisers, thirteen; unprotected cruisers, three; gunboats, ten; composite gunboats, six; special class, three; steel torpedo boats, twenty-three; wood torpedo boats, one; iron cruising vessels, five; wooden cruising vessels, eleven; sailing vessels, six; tugs, fourteen; wooden steam vessels unfit for service, eight; wooden sailing vessels unfit for service, six.

Secretary Long is expected to ask congress in his forthcoming annual report to authorize the construction of two gunboats for the naval militia. The building of such gunboats would mean the release from a great deal of work of all of the warships of the navy stationed on the Atlantic and Pacific stations, and allow them to carry out without interruption the full programme of maneuvers usually prepared for the summer months, and, in addition, will enable the naval militia to be instructed in the winter as well as in summer. The navy department would assign only a small detail of officers and men to gunboats of this character, leaving the militiamen to make up the required complement.

Business men of Philadelphia propose to keep congress and the president reminded of their promises regarding American shipping. At a recent meeting of the board of trade of that city resolutions were adopted directing the officers of the board to forward to President McKinley communications calling attention to the pledges of the recent campaign to use the influence of the government in building up the American merchant marine. The president will be urged to give the subject prominence in his message. It is proposed also to urge the matter at the annual meeting of the National Board of Trade in December.

Approximately $26,000,000 has been appropriated by the United States government during the past ten years for coast defenses. This is about one-third of what is required, in the opinion of army engineers to put the country in safe condition of defense. The money has been expended in the construction of modern fortifications and high-powered guns of great force and magnitude. A modern gun, with its carriage, emplacement and ammunition, costs on an average $100,000.

Advertisements for the construction of a vessel for coast survey purposes will be issued by the navy department in a few days. The vessel will be of 800 tons displacement and capable of steaming 8 knots an hour. She will carry a coal supply of 200 tons to enable her to steam long distances. The contract will require her completion in fifteen months, and she has already been nicknamed the Klondike, because she is intended for service in surveying the coasts of Alaska and the Aleutian islands.

Gen. J. H. Kidd of Ionia, Mich., is secretary of the commission of engineers that is now engaged on surveys for a ship-canal from the lakes to Atlantic tidewater.

We are all Farmers!

An awful story of reckless sailors on the lakes—green farm hands and backwoods lumber men going out in old tubs—comes from the London Free Press. The tale sounds much like an effort to frighten foreign underwriters. It is especially ridiculous in view of the fact that out of some 3,500 ships of all kinds on the lakes there have been only three total losses of any account thus far this season, and these were wooden vessels that were well along in years and had been unfortunate enough to be caught under conditions that are likely to befall a ship in any part of the world. The London publication says:

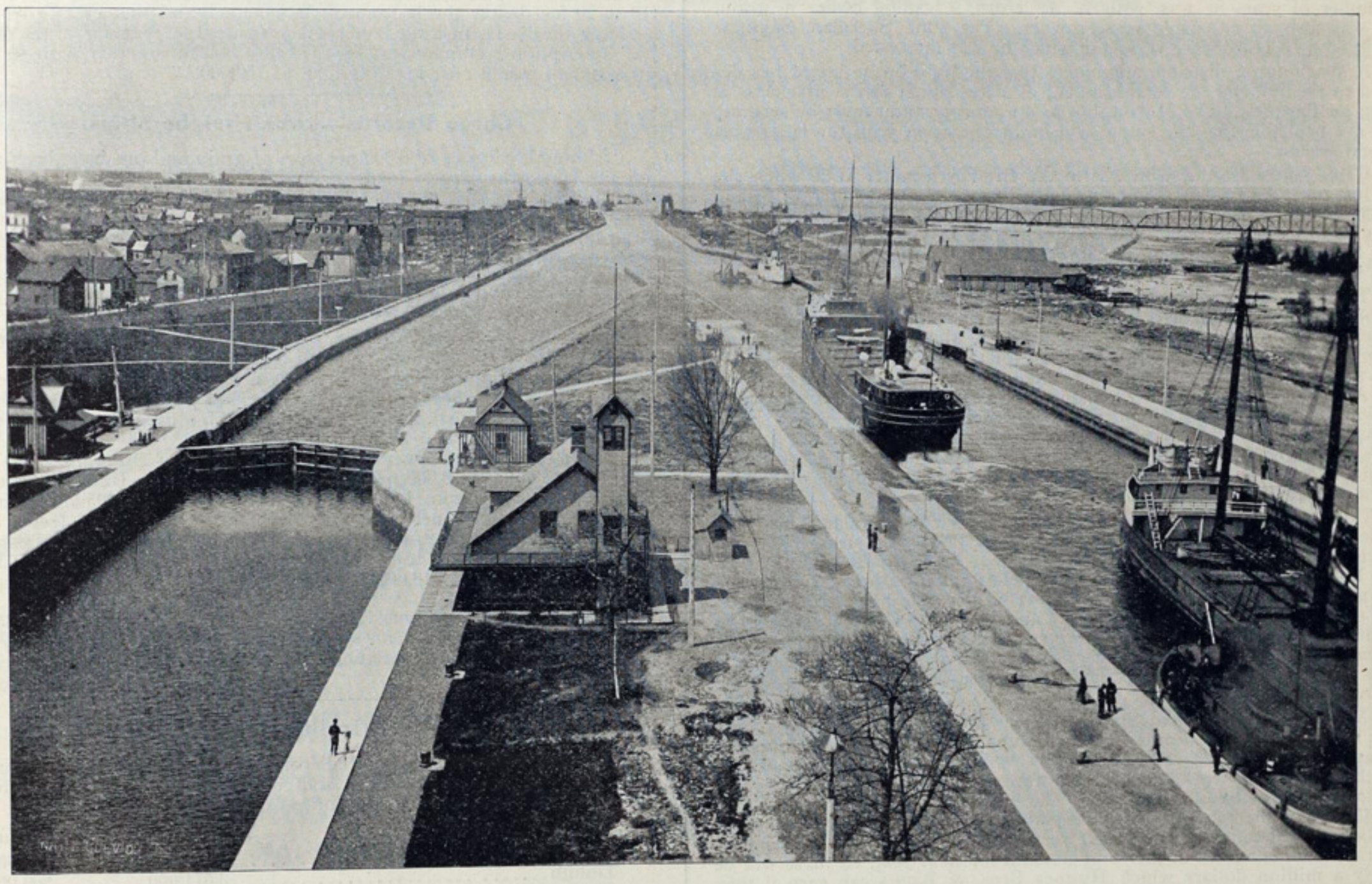
"A prominent forwarder of lake cargoes severely reprobates the reckless way in which vesselmen fly in the face of almost certain disaster at this time of year. He says the annual loss of life and property on Lake Erie is proportionately larger than that on the Atlantic ocean. The skippers seem to brave every risk, being ready to start from port in the most threatening weather with vessels that are hardly fit for service in fair weather. It is stated, as a fact, too, that there are more unseaworthy craft braving the treacherous waters of the lakes during the most dangerous season of the year—October and November—than at any other time. There is reason for this, though, for grain shipments are livelier as the season draws to a close. Cargoes are consequently more plentiful and freights higher. Every vessel that will float can command a cargo. There is not a more reckless class of men on the face of the earth than these fresh-water sailors, although they have the terrible fact constantly before them that hundreds of their fellows are lost annually on the lakes, nine-tenths of them going down with the rotten craft they begged the privilege of sailing on. This fact is made the more startling because it is well known that the dangers of lake navigation—especially Lake Erie—are so great that even the staunchest vessels are freqently unable to weather them. It is truly said by the authority quoted that the November gales on Lake Erie are indescribably frightful. The skippers depend largely on landmarks for guides in navigation. The blinding rain or sleet that nearly always accompanies these storms obliterates these marks sometimes for days, and as the sea-room is limited, vessels caught in these gales are in constant danger of going to pieces, either on the rocky shores or on some of the islands that stud so thickly these inland seas, or being suddenly swamped as the Idaho was. The singular recklessness of the sailors on these ships is accounted for by the fact that many of them are farmers, or, rather, farm owners. The individual land holding in the vicinity of the lake ports of some of these dare-devil sailors is considerable. The moment navigation closes they return to their farms, remain there until it re-opens in the spring, and then hasten back to the lakes to tempt death on any old craft where they can get the best wages, leaving their wives and children to look after the farms."

Torpedo boats Nos. 15 and 16 for the United States navy, which are to have a speed of 20 knots, were launched at the yards of the Messrs. Herreschoff, at Bristol, R. I., on the 15th inst. Their dimensions are: Length, 100 feet; beam, 12 feet, and draught, 3 feet 3 inches. They are to be fitted with two torpedo tubes 18 inches in diameter.

A Dream of British Gunboats on the Lakes.

Some of the Canadian newspapers never tire of discussing ship-canals. Their enthusiasm over the proposed canal from Georgian bay to Montreal is wonderful, in view of the struggle that has attended the construction of 14-foot channels through the St. Lawrence. The promoters of the Georgian bay-Montreal project estimate its cost at $15,000,000. The company's charter authorizes it to borrow $30,000,000 at 4 per cent., of which interest it is expected that the Dominion government will assume 1 per cent.—that is, one-fourth. The share capital is $10,000,000 and the initial traffic estimated at 8,000,000 tons per annum; so a satisfactory provision is figured out not only for the fixed charges, but for all the "water" in the scheme. Besides competing for traffic eastward, the canal will open up, it is claimed, a great timber district to the Chicago and other lake markets. But it is the military aspect of the canal that is being urged from a British viewpoint. On this score a writer in the Saturday Review says:

"It is proposed so to construct the canal that gunboats may be taken through it and used for patrolling the great lakes, thus giving the advantages of naval protection to about half of the international boundary line of British North America. It was with this in mind that the great Duke of Wellington sixty years ago urged the necessity for constructing some such waterway; and the same reason in more recent years prompted Lord Wolseley and Sir John Michel to advocate a canal scheme similar in most of its details to that now proposed; it is partly also for that reason that the Canadian government is manifesting an interest in the proposal. There seems every prospect, too, that the war department in London will likewise look favorably upon it; at any rate, Mr. McLeod Stewart, who represents the Montreal, Ottawa & Georgian Bay Canal Co., and who is now in England mainly for the purpose, is in communication with the war office, and is sanguine of the result. It is to be hoped that we shall never be at war with the United States, but the thing looked very possible less than a couple of years ago. The attempt at permanent arbitration has not been a success, and, anyway, the strengthening of one's defenses is the surest guarantee of continued peace."



View of Old and New Locks in United States Canal at Sault Ste Marie, Looking Towards Lake Superior from Top of New Power House.

[PHOTOGRAPH BY BELL, SAULT STE MARIE.]

Frank S. Manton, agent of the American Ship Windlass Co., Providence, R. I., has written a letter to the New York Maritime Register correcting statements made in a paragraph widely published, which asserted that the 22-inch hawser used in towing the large floating dock from England to Havana was the largest and strongest in the world. Mr. Manton contradicts this statement and points to the fact that the Bessemer Steamship Co. of Cleveland has used seven of the Shaw & Spiegle patent automatic steam towing machines, carrying a 1¾-inch diameter steel wire hawser, each towing a barge carrying 5,000 to 6,000 net tons of cargo. The weight sustaining capacity of these cables is believed to be fully 7,000 tons; they weigh about 6,000 pounds and are 1,200 feet long. The English hemp hawser weighed five tons; was about 700 feet long, and its breaking strain was 180 tons.

An up-to-date lithograph map of the Alaskan gold fields, printed in six colors, complete and accurate. If interested, send five 2-cent stamps to advertising department, Nickel Plate Co., Cleveland. Dec. 31, 393.

Around the Lakes.

The small steamer City of Marquette, which is used for excursion purposes on Lake Superior, will be given a new boiler and a general overhauling at the works of the Detroit Dry Dock Co. during the winter.

Capt. Shoemaker of the revenue marine service has issued orders to the cutters on the great lakes to go into winter quarters Nov. 30. The Fessenden will lay up at Detroit, the Calumet at Chicago and the Gresham at Milwaukee.

Four Scotch boilers, which Wickes Bros. of Saginaw will build for the 475-foot Rockefeller steamer under construction at F. W. Wheeler & Co.'s yard, West Bay City, will each be 13½ feet in diameter and 12 feet long and will be allowed 200 pounds working pressure.

It is quite probable that the number of vessels wintering at upper-lake ports will be much larger than usual, on account of the late shipments of coal. Several vessels are chartered for Manitowoc and a few other Lake Michigan ports with the understanding that their cargoes will be held for several weeks.

King Folding Canvas Boat Co. is the name of a new Kalamazoo (Mich.) concern that will engage in the manufacture of the canvas boat patented by Chas. W. King of Kalamazoo. It is expected that a large demand for a portable boat of this kind will be found at Seattle and other northwestern points among Alaskan gold seekers.

Duncan Stewart, for many years a prominent citizen and vessel owner of Detroit, died in that city on Friday last, aged seventy-nine years. For a number of years he was, with W. L. Hurd, a leading dealer in grain, and was also an extensive vessel owner. The Phil. Sheridan, Saginaw and Joseph L. Hurd were vessels in which he was interested.

A Washington dispatch announces that the light-house board has decided to recommend the establishment of a fog signal of the first class at Point au Barques, Lake Huron, but as an appropriation must be secured, it is not probable that the signal will be in operation until the latter part of next season.

Capt. James Loftus, who was in the Bradley steamer Hale when she was lost on Lake Huron, is in command of the Gilchrist steamer V. Swain, which sprung a leak on Lake Erie, a few days ago, while bound up the lakes with a cargo of coal, and was compelled to put into Amherstburg. The Swain had been tied up in Cleveland for some time before going out with this cargo.

The steel steamer Samuel Mitchell has just taken a cargo of coal to Sheboygan. The Mitchell is one of the Cleveland Rolling Mill Co.'s vessels, and trades regularly in ore between Marquette and Cleveland. Although Capt. Wilford has been sailing for thirty-seven years, this is the first time he has been called upon to take a vessel into Sheboygan.

An error was made in reporting the location of the wreck of the schooner Groton, which foundered in Lake Erie recently, while bound from Cleveland to Port Stanley with a cargo of coal. The wreck lies 9½ miles S. W. by W. from Port Stanley light and 1½ miles S. E. of Talbot point in 40 feet of water, with 25 feet over the deck. Both masts are out of water with the foretopmast gone.

Col. Jared A. Smith, United States engineer at Cleveland, has purchased for the use of the Cleveland district the small steel steamer Visitor, which was owned by V. Doller and others of Sandusky and Put-in-Bay. The Visitor is a steel vessel, built by the Detroit Dry Dock Co. five years ago and measures 70 feet keel and 20 feet beam. She has a triple expansion engine and is capable of a speed of about 13 miles an hour. For work conducted mainly by Assistant Engineer Wm. T. Blunt the government has been compelled for several seasons past to charter the steamer Swansea from H. M. Allen of Toledo. The latter vessel will now be returned to her owner.

Major Symons, United States engineer at Buffalo, is of the opinion that work on the breakwater at that point is not going along rapidly enough. He says that only about $100,000 of the $500,000 appropriated for the first year's work on the breakwater has been earned by the contractors, Hughes Bros. & Bangs. "There will be an unexpended balance of $450,000 or thereabouts," Major Symons says, "from this year's appropriation, which can be used in next year's work, and we expect an appropriation from congress of the same amount for next year, so there will be nearly a million dollars which Hughes Bros. & Bangs can earn if they want to. There is no reason why they cannot do it, but they must work more rapidly than they have been working during six months of the present season."

When Possible, Give the Other Fellow a Wide Berth.

A man who walks about a steamer's bridge day after day and night after night without once seriously and carefully working out a few collision problems in his mind, is the person most likely to fall into a glaring error when the opportunity presents itself. What is to be said for those disastrous collisions which take place during a fine clear day, or when, at night, with the stars shining brightly, the lights of an approaching steamer can be seen even before her hull has actually cleared the horizon? As a rule they happen when the bridge is in charge of young and not well experienced officers, who, however smart they may be in carrying out general duties, too often fall into the mistake of following the rule of the road too absolutely. "If I see a steamer's masthead and red light just a little on my port bow, and find that she is approaching me on a nearly parallel line, I know that she will pass me to port, and consequently I am all right." So far, yes. But does he remember that in such circumstances ships may pass each other at distances much too close for a safe high speed in the open sea? What happens if, on getting within a short distance of each other, one ship takes a yaw in her steering, and to such an extent as to accidently show her green light? The officer may suddenly conclude that it is owing to a designed change of course, and there being, as he thinks, no time now to lose, he orders his own helm a-starboard! The most successful officers are those who determine to give other vessels a good wide berth. If commanders advised such circumspection more often than they do in "night orders" there would be fewer inexcusable collisions.—Nautical Magazine.

Argument against Floating Dry Docks.

Plans for a floating steel dock, suggested recently by the naval dry dock board, do not meet with approval in the department, especially in view of the great draft of battleships, for which such a dock should be made available. Among many reasons given for disfavoring a floating dry dock is that the cost of maintenance would be excessive, owing to the fact that the interior pontoons could not be protected, and deterioration of the steel would be very rapid. It is said that the annual cost of maintaining the steel floating dry dock at Bermuda, W. I., is $65,000 per annum, and that there would be no floating dry dock at that point if a site for a stationary dock was obtainable, the same being true as to Havana, Cuba, for which port a floating dry dock was recently constructed. Instability and insecurity are urged against the floating dry dock, because the water ballast would be continually changing its position with each change of the level of the dock, making it impossible to use the dock in a seaway. The docking of a large ship is a delicate operation at any place or time, but would be doubly so when undertaken at sea or in an open roadstead. The probabilities are, that should the weather become stormy, either during the operation, or while dock and ship were being towed into port, both ship and dock would go to the bottom. It is also stated that such a dock would require a basin at least 50 feet deep to accommodate a battleship drawing approximately 30 feet of water. The bottom section of such a dock would be at least 15 feet deep, and allowing 5 feet for clearance, it is thus seen that not less than a basin of 50 feet in depth would accommodate the dock. The channels at most navy yards do not exceed 30 to 35 feet in depth, and it is therefore clear that the basin would be from 15 to 20 feet below the bottom of the channel, and that every tide would shallow the basin, making it necessary to dredge constantly. A dock of the description recommended by the navy board, together with its basin, it is stated, would cost not less than $1,750,000.

Cargo Records—Lake Freight Ships.

Although cargoes of 6,300 net tons of grain and ore have been moved on the lakes, the largest loads of coal have not been within 600 tons of that figure. The big vessels do not wait to fill out coal cargoes when the supply in cars is not at hand, and the tendency, anyhow, is to avoid deep draft on up-bound trips. The largest load of coal ever moved on the lakes was that of the steel barge Polynesia—5,654 net tons, taken from Cleveland to Duluth. The next largest cargo—5,369 net tons—has just been loaded by the Wilson line steamer Carnegie and is also bound to Duluth. Following are the corrected cargo records:

Iron Ore—Schooner Amazon, owned by James Corrigan of Cleveland, 5,631 tons gross, or 6,307 net, Duluth to South Chicago, draft of 17 feet 1 inch; steamer Empire City, A. B. Wolvin of Duluth, 5,622 tons gross, or 6,296 net, Two Harbors to Cleveland, draft of 17 feet 2 inches; schooner Polynesia, James Corrigan of Cleveland, 5,477 tons gross, 6,134 net, Duluth to Fairport, draft of 16 feet 8 inches.

Grain—Steamer Crescent City, A. B. Wolvin of Duluth, 225,000 bushels of corn, equal to 6,300 net tons, South Chicago to Buffalo, draft of 17 feet; schooner Amazon, James Corrigan of Cleveland, 205,572 bushels of wheat, equal to 6,167 net tons, Fort William to Buffalo, 16 feet 8 inches draft; steamer Empire City, A. B. Wolvin of Duluth, 205,445 bushels of wheat, equal to 6,163 net tons, Duluth to Buffalo; steamer Crescent City, A. B. Wolvin of Duluth, 318,000 bushels of oats, equal to 5,088 net tons, Duluth to Buffalo.

Coal—Schooner Polynesia, James Corrigan of Cleveland, 5,654 net tons of bituminous, Cleveland to Duluth, 16 feet draft; steamer Carnegie, Wilson Transit Co. of Cleveland, 5,369 net tons of bituminous, Cleveland to Duluth.

Stock of Grain at Lake Ports.

The following table, prepared from reports of the Chicago board of trade, shows the stocks of wheat and corn in store in regular elevators at the principal points of accumulation on the lakes, Nov. 20, 1897:

	Wheat, bushels.	Corn, bushels.
Chicago	4,712,000	18,736,000
Duluth	3,571,000	900,000
Milwaukee	214,000	344,000
Detroit	341,000	133,000
Toledo	440,000	525,000
Buffalo	1,537,000	1,823,000
	10,815,000	22,461,000

As compared with a week ago, the above figures show, at the several points named, an increase of 421,000 bushels of wheat and a decrease of 1,176,000 bushels of corn. On the same date there was afloat on the lakes 1,630,000 bushels of wheat, 2,627,000 bushels of corn and 1,588,000 bushels of oats. Grain afloat on the canals aggregated 382,000 bushels of wheat, 611,000 bushels of corn and 529,000 bushels of oats.

New Station.

The new Twenty-third street station of the Pennsylvania Lines in New York is fast becoming popular with Cleveland people. The new cab service inaugurated by this line, with only a nominal charge, is what the people long have wanted. The 1:40 p. m. train from Cleveland has through sleepers to New York without change, and diner serving supper. This express train also makes quick time to Pittsburg, Baltimore, Washington and Philadelphia. For rates and full information call at City Ticket Office, 149 Superior street, Cleveland.

A meeting of Harbor No. 42, American Association of Masters and Pilots, the first of the season, will be held at the Superior street hall of the organization on Monday evening next.

Jan. 17 is the date fixed for the opening of the convention of the Marine Engineers' Beneficial Association (national organization) in Washington.

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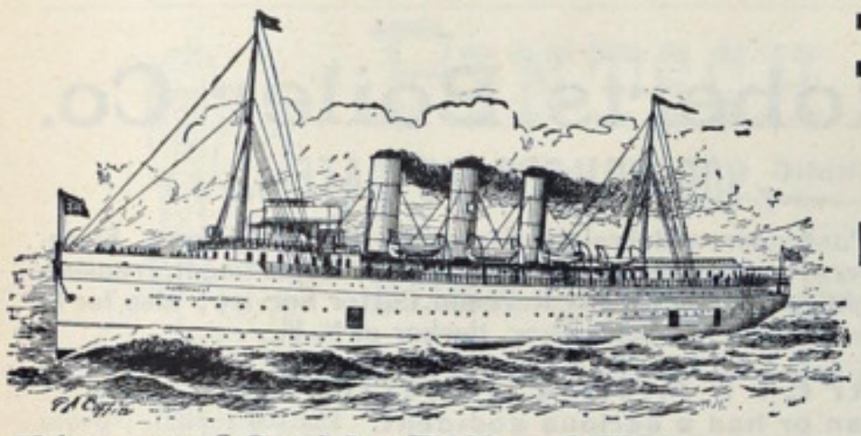

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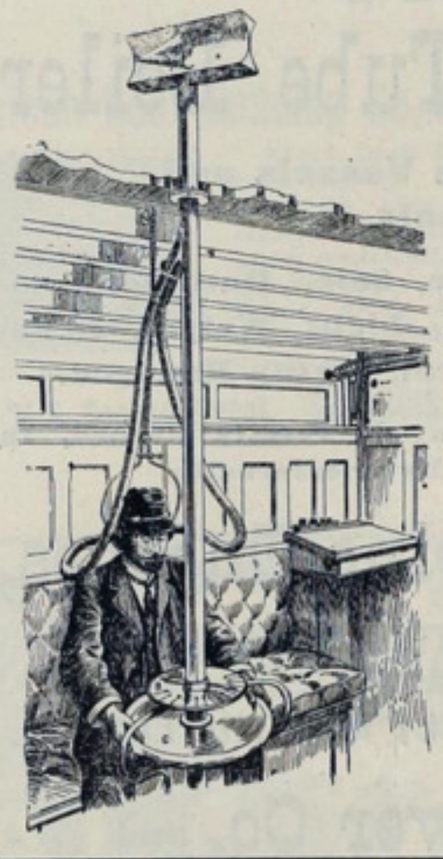

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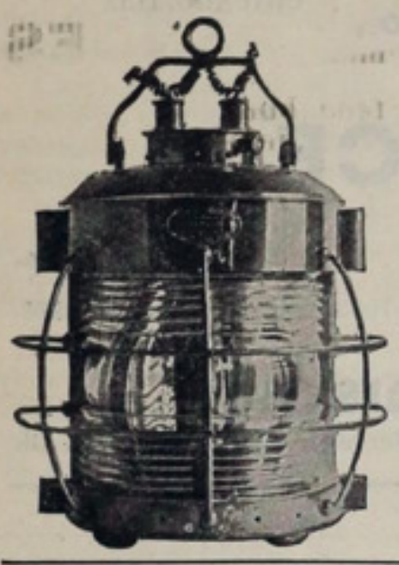

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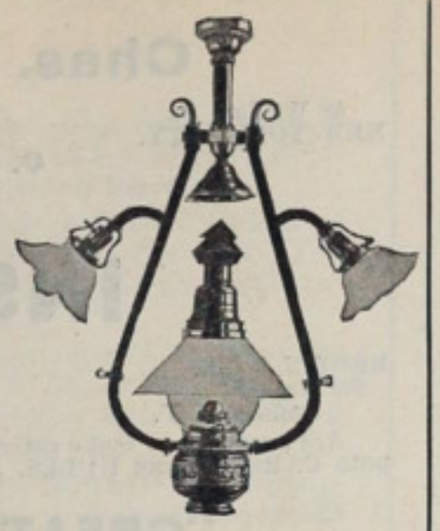

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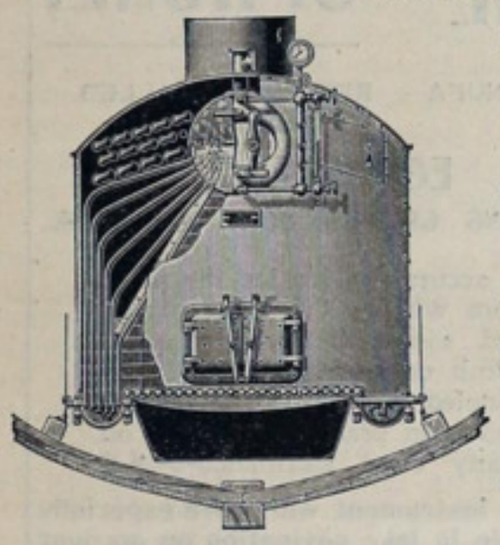

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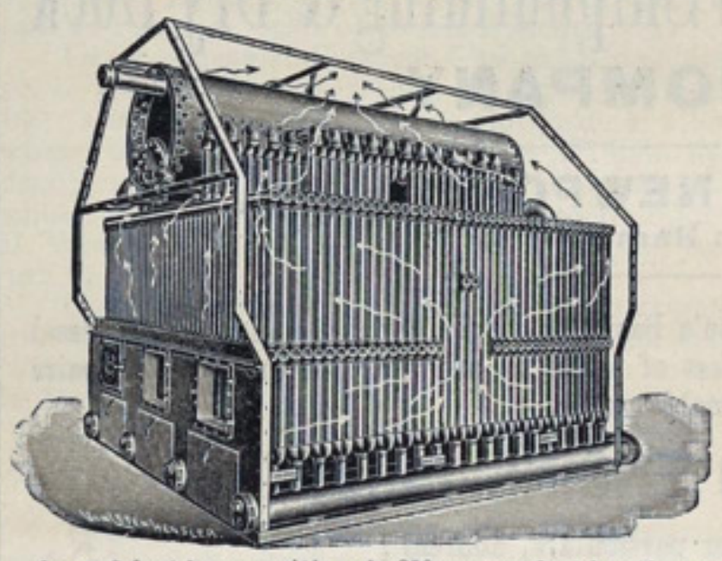

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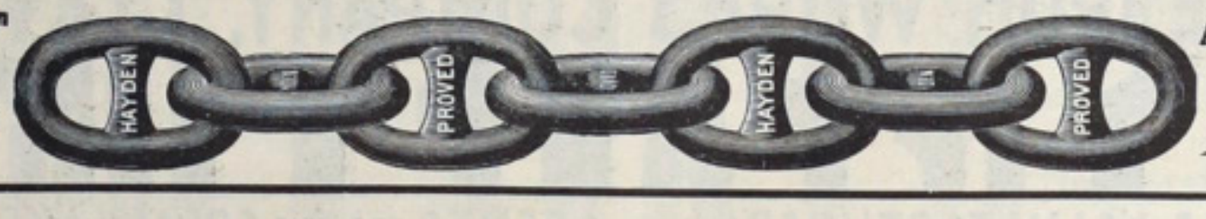

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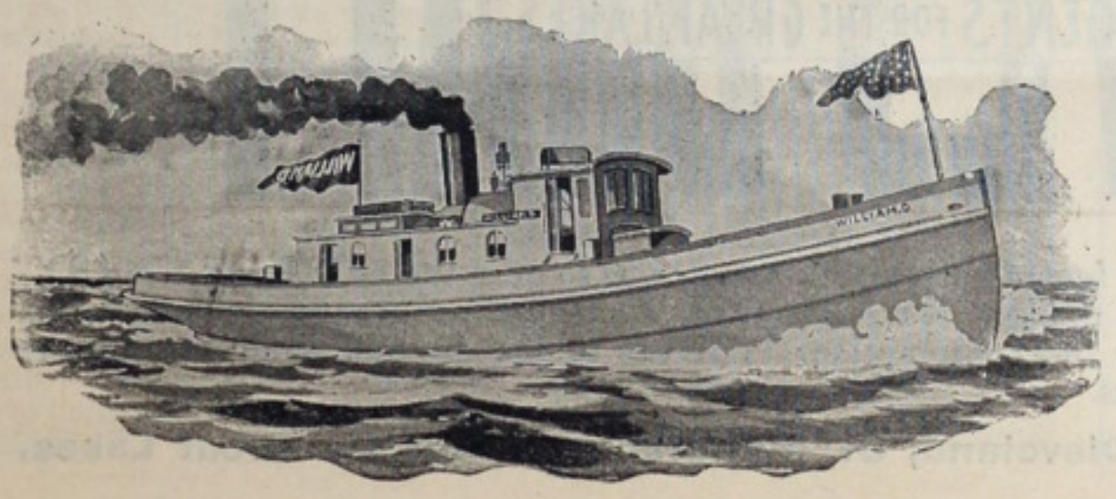

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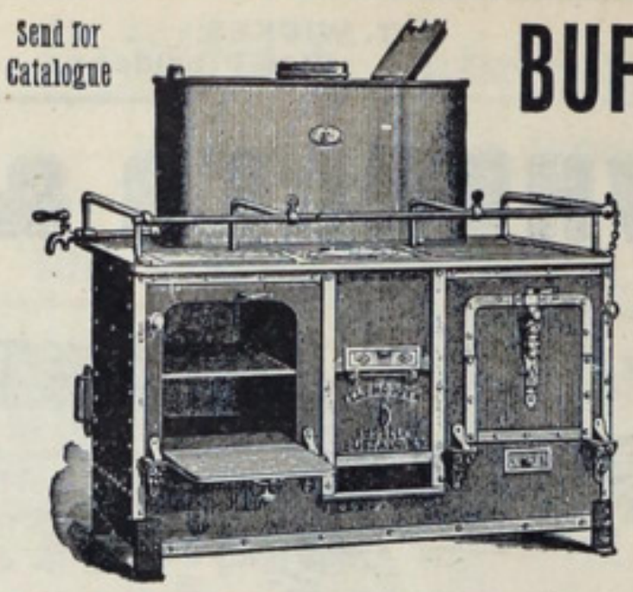

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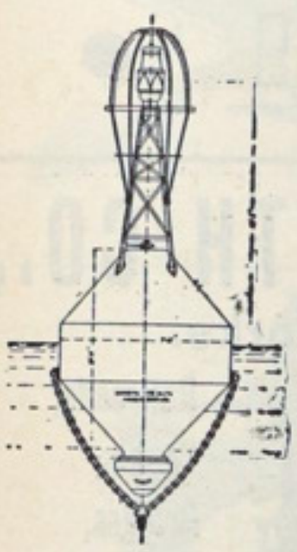

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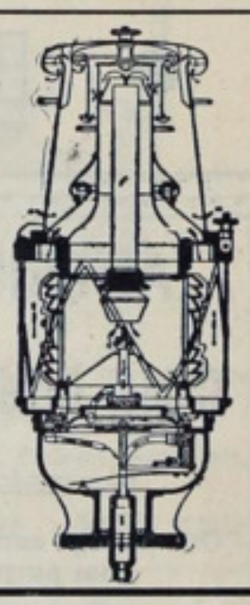

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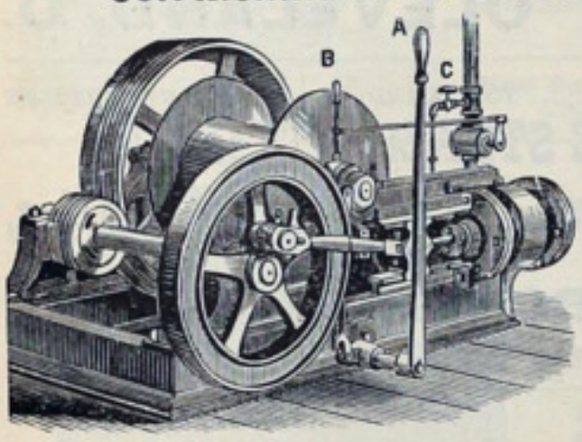

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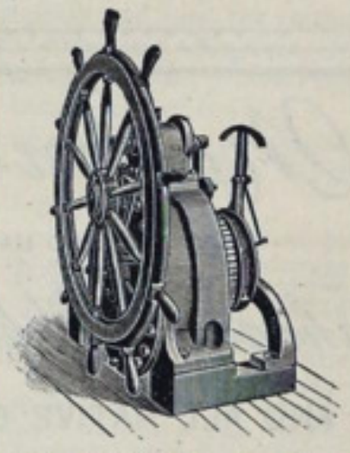

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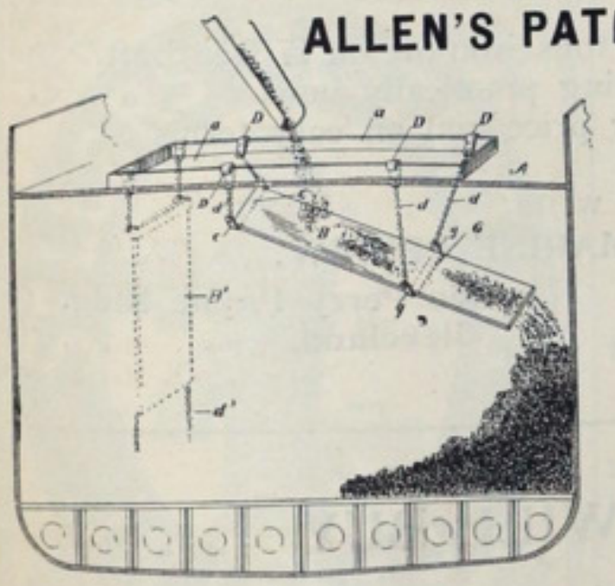

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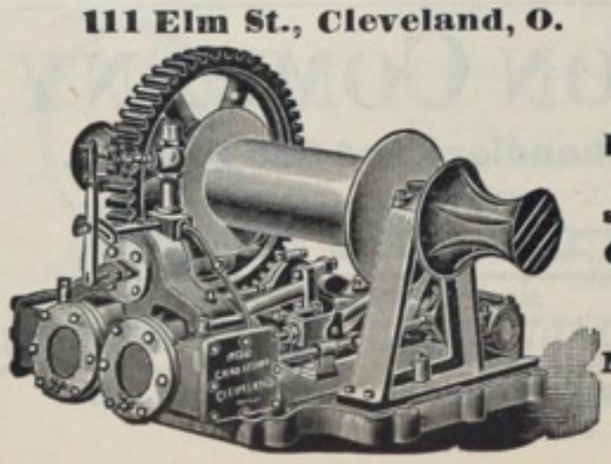

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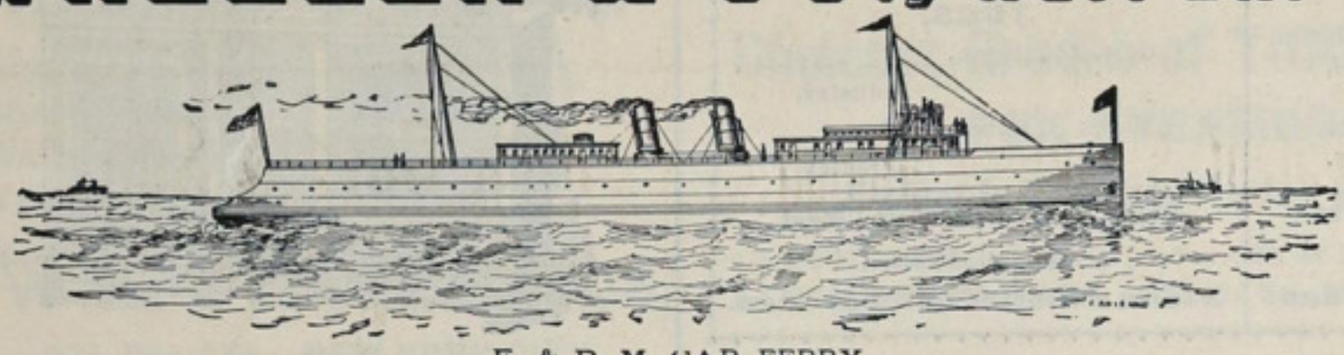

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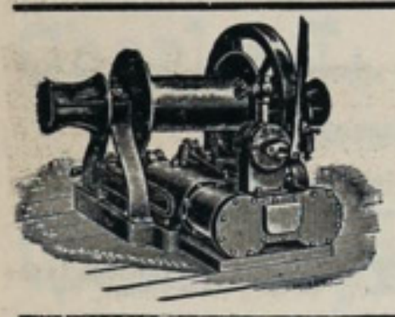

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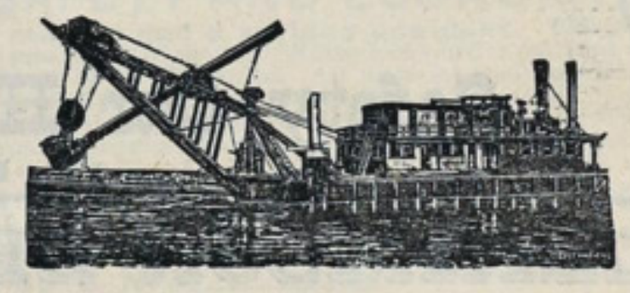

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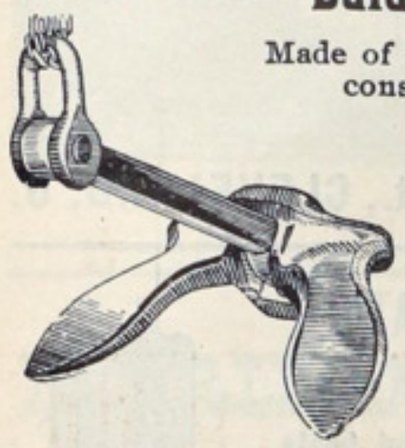

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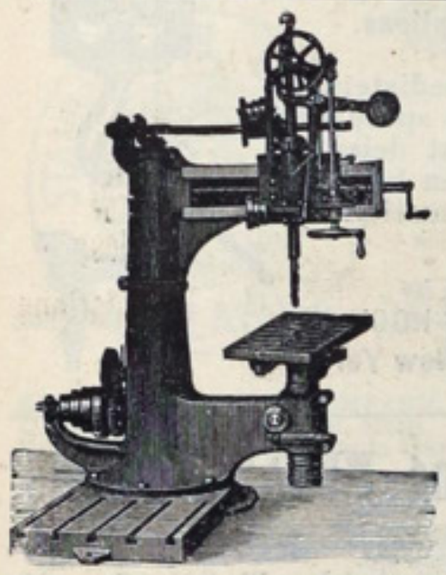

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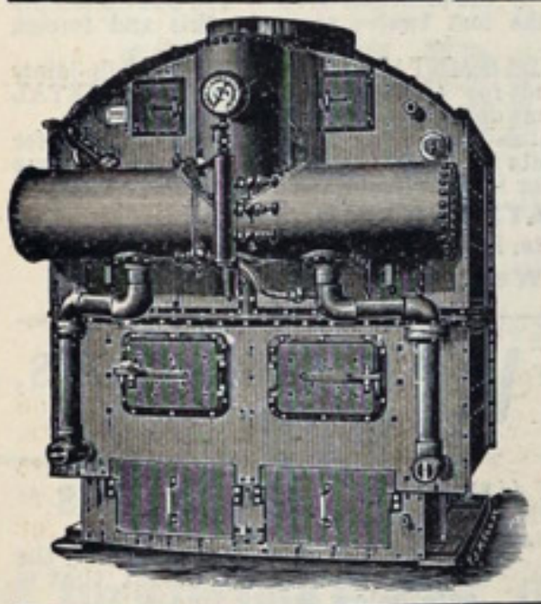

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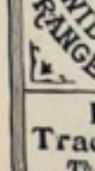

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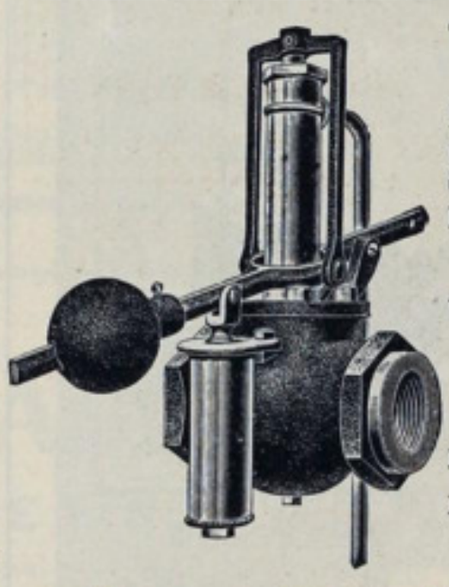

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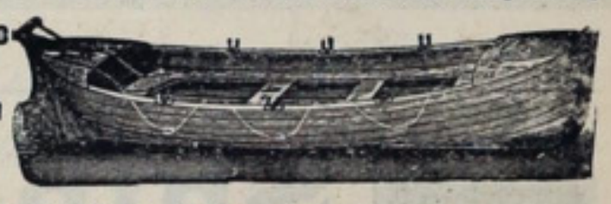

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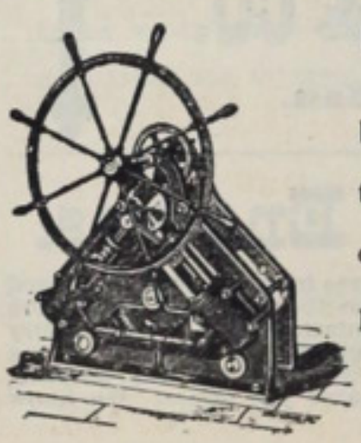

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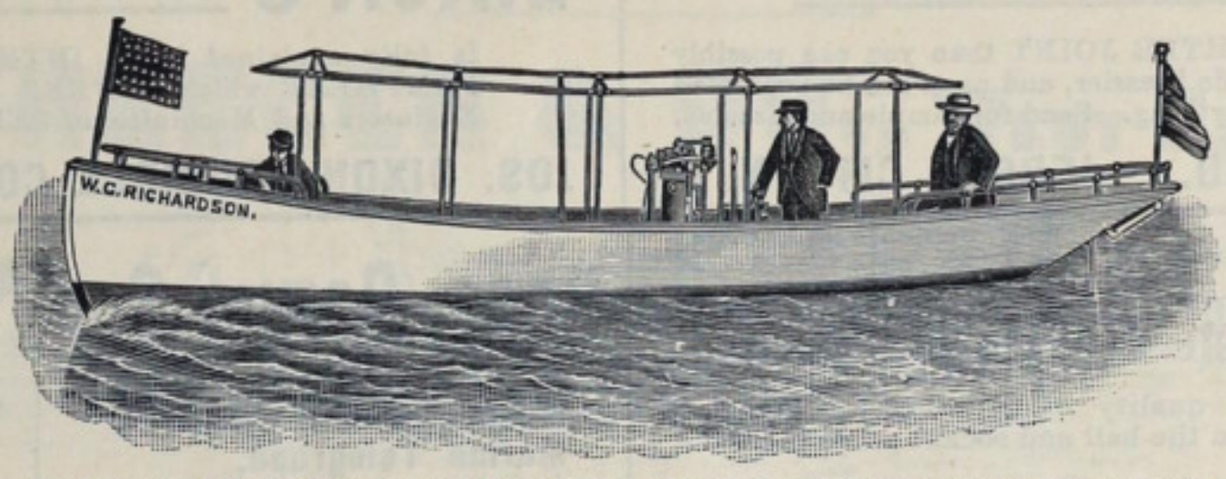

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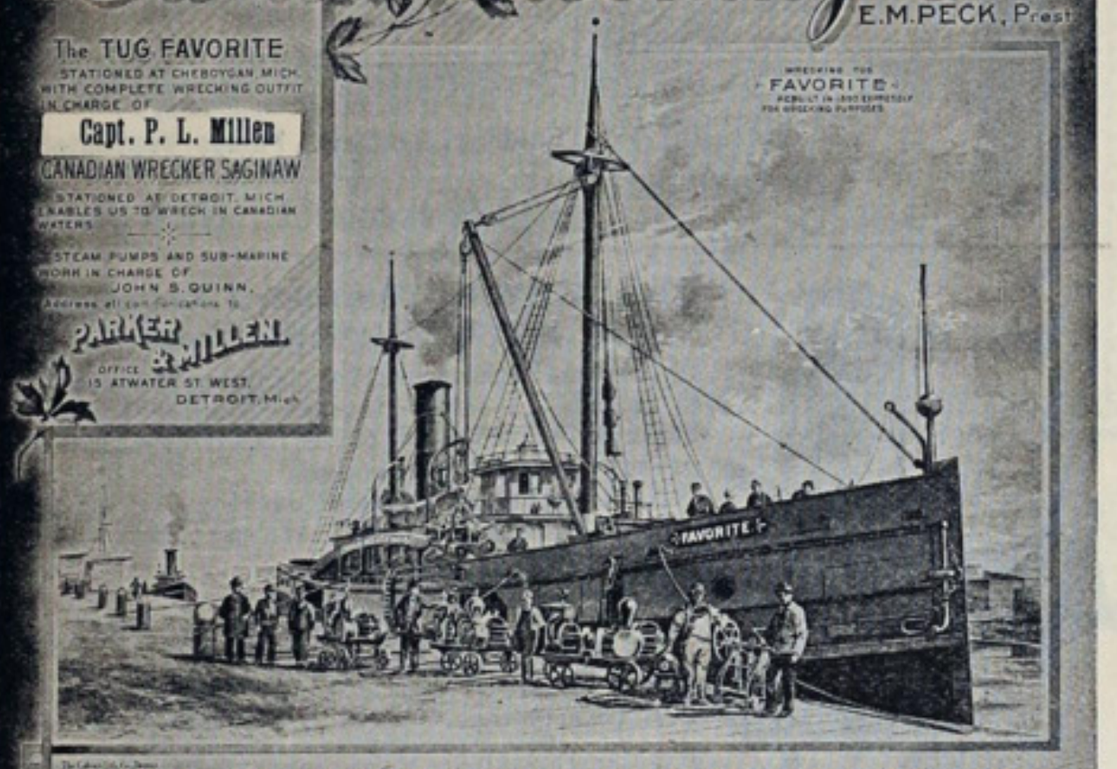

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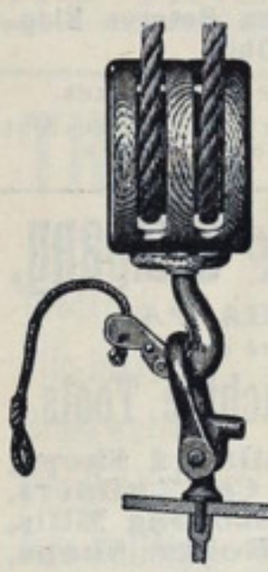

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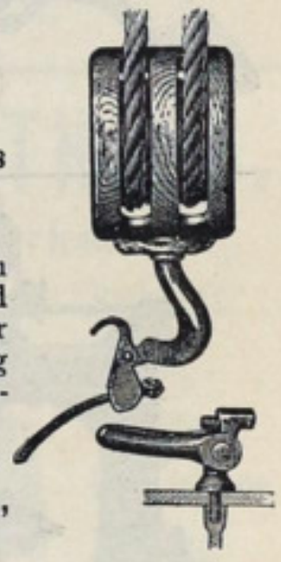

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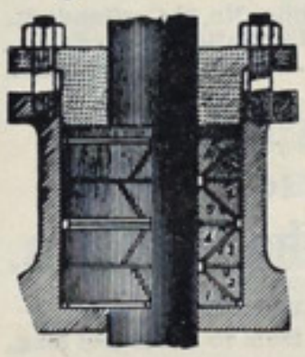

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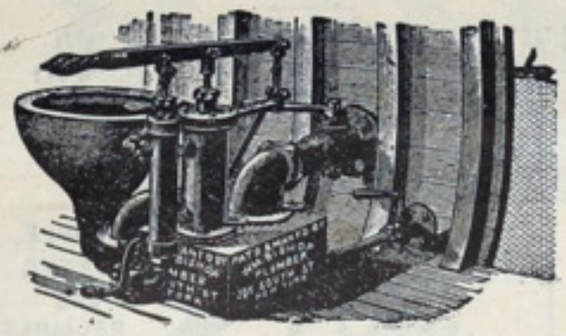

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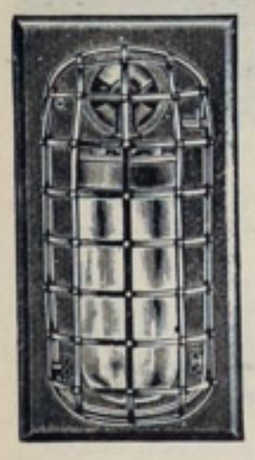

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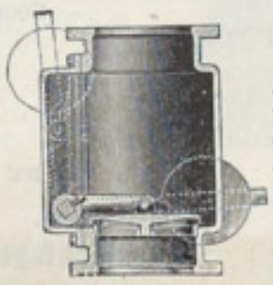

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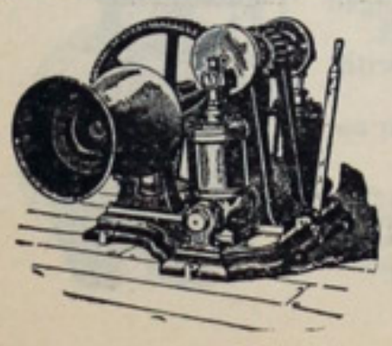

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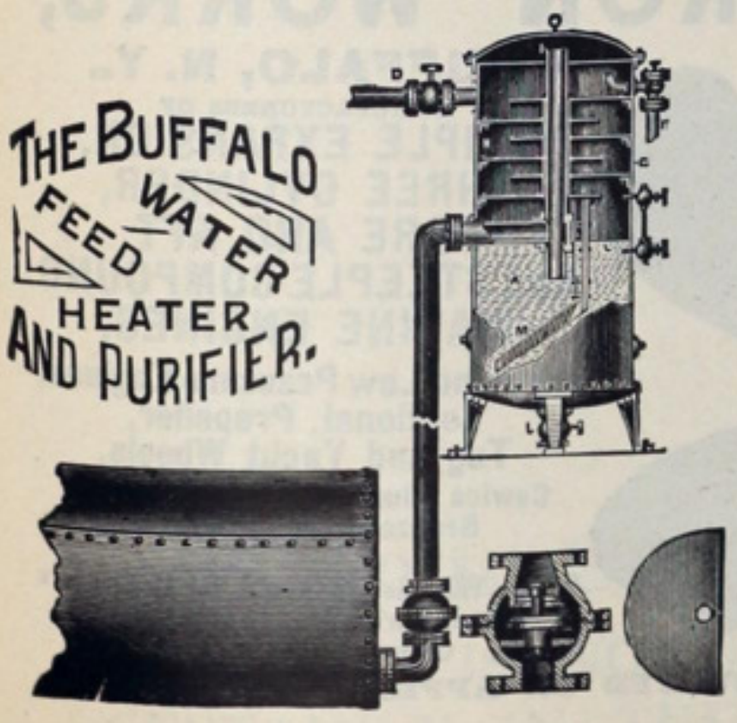

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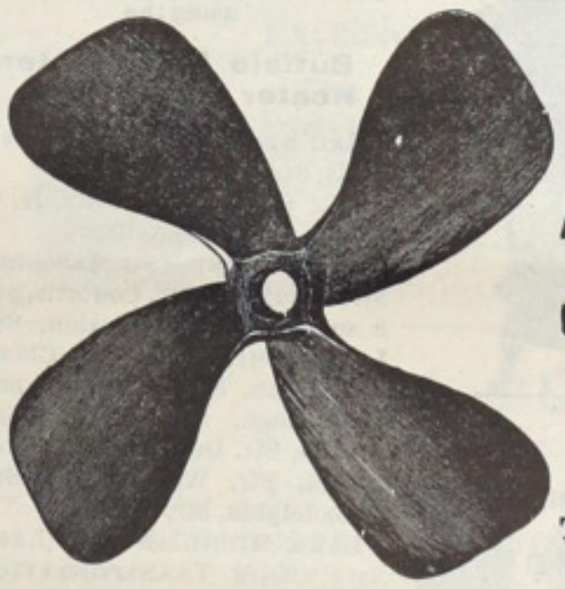

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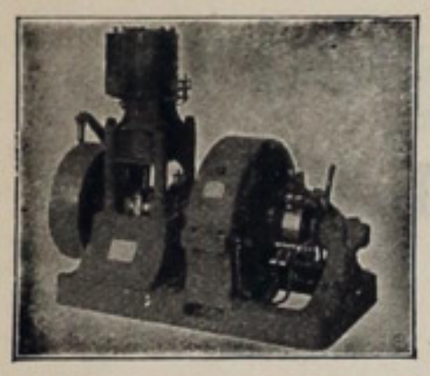

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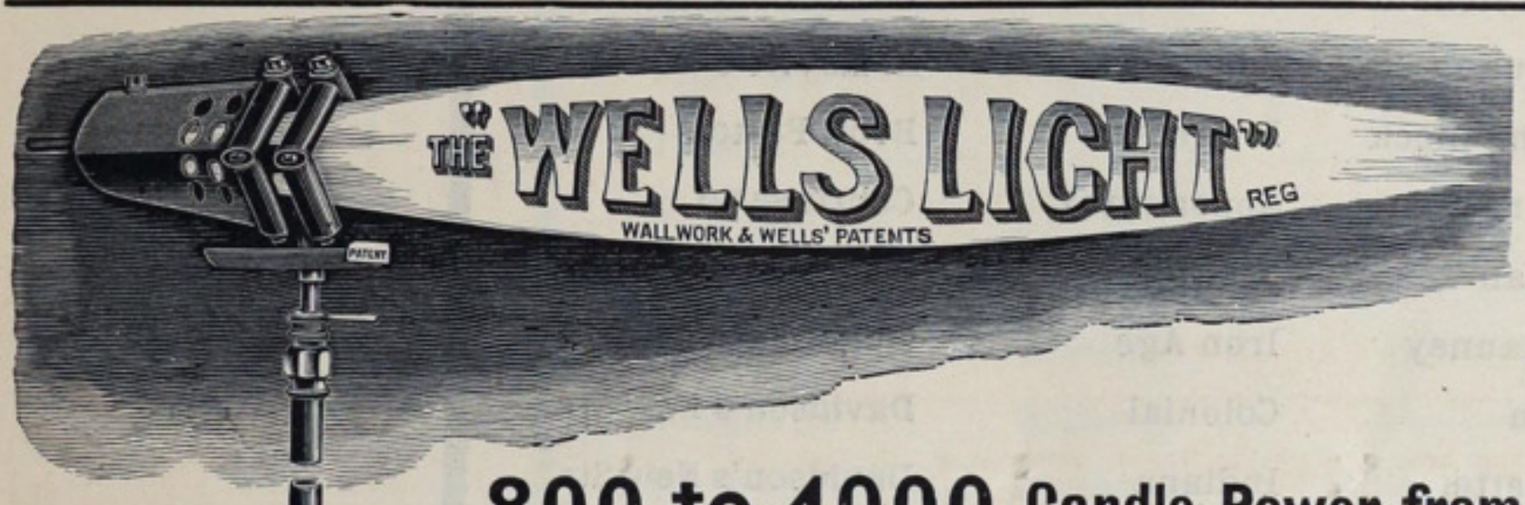

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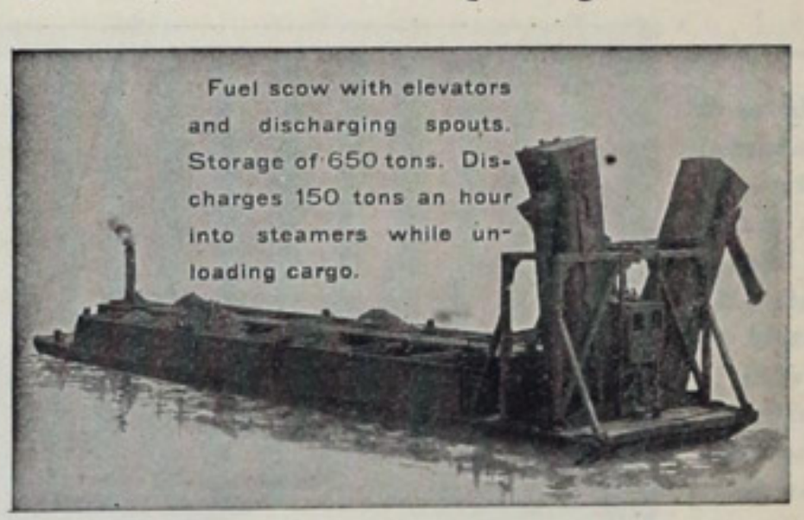

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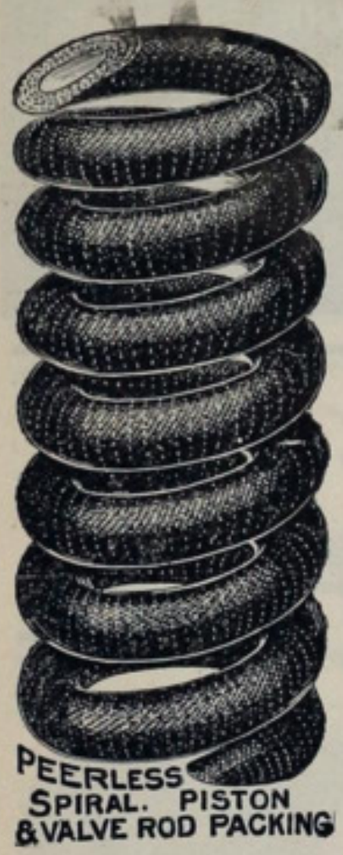

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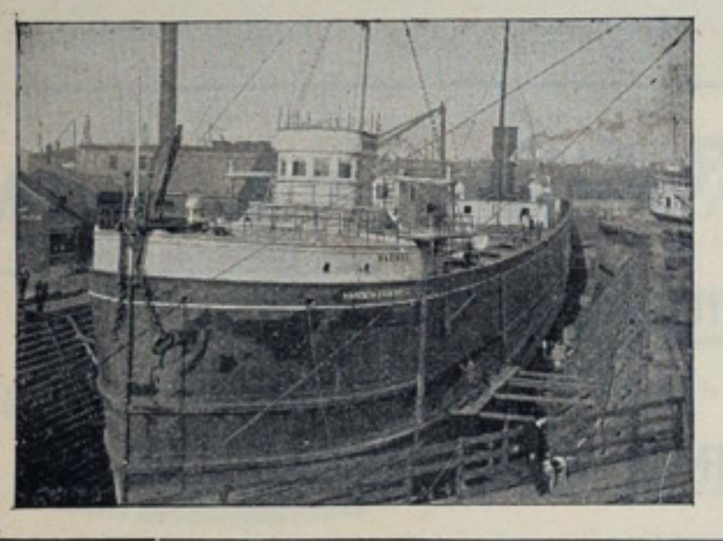

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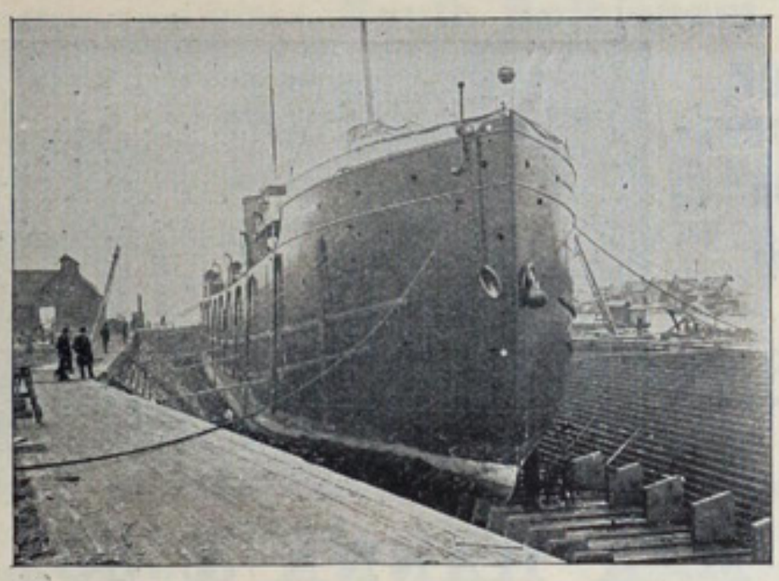

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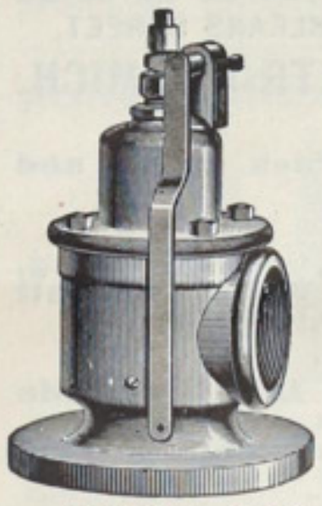

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